SCIENCE FOR VILLAGES. VOLUME.3, 1980-82

SCIENCE FOR VILLAGES

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Is Big Really Cheap?

An important industrialist of the country, according to a recent press reports, has ridiculed the idea of small or decentralised being right. He has put up the plea that whatever can be made available cheap to the consumer, and can withstand the market, only that should be termed as 'appropriate'. There is no doubt that all industry and commerce is based on the above thumb-rule of competitive economy. The issue, however, is as to how you get your product made 'cheaper' than others. If cheapness was the sole criterion, smuggling, thieving and banditry would be counted the most appropriate trades. Their mode of providing goods to their clients are obviously the cheapest. Cheapness, therefore, has to be qualified with social justice–and with being just to Nature. If things are made cheap by exploitation of man or over exploitation of resources of Nature, such methods could not be termed as 'appropriate'.

Let us see how some goods are cheaper than others. The differential costs in two comparative modes of production can be due to different rates of raw material availability, differing techniques–one having less efficiency than the other, the rate of energy/labour being different, marketing system being more favourable to one, transport costs being less for one and unequal taxes and fiscal laws. The cheapness of cost is dependent on the cumulative effect of the manufacturer. The total dependence of the community on a single manufacturer gives the latter full scope to take any price for its product and still one may have to term it as 'cheap'. Raw materials are also not available to every one at the same rate. The import license allows some to get imported raw materials cheaper than those who are deprived of the privilege. The purchase of indigenous agricultural raw materials in large bulks by those who can invest heavily, allows the produce neither a fair price for his produce nor gives any chance to purchase on which their livelihood depends. Than there are certain things like the forest produce for example which government allows to be taken on contract by big contractors, leaving the 'small' high and dry. The falacy of all falacies seems to be that goods that belong to the community as a whole are made to preferentially benefit the particular few with money and influence, making it far cheaper for them than for others.

Even if the raw material supply system is just and equal, which it seldom is, since the greater the capital, the more shrewed is the manipulator and more corruption prone the system the motive power or energy is given at advantageous rate to the 'big'

Let us analyse the situation on energy supply a little more. The 2/3rd of our villages, which still lack electricity for no fault of theirs, depend solely on their manual and animal power. In these villages, the energy being animate is bound to cost many times more than in the villages which get inanimate power. Ought the cost of energy provided to fewer people not have some parity with the cost of the universally availab energy. If the energy is to be such– one manday = 1/13 h. p. and one pair of bullocks = 1hp. the cost of one horse power available from electricity should not be made inordinately cheaper for the privileged. Social justice demands some balancing formula to be evolved for the purpose. One method for instance could be-and this can certainly be enforced - that one horse power of human energy be paid about 6 times than what bullock power costs for the same h. p. and the electricity etc. rated not less than one–half of the bullock power rate. This will mean that for 8 hrs. of work from a pair of bullocks equivalent to one h. p. the cost be taken as Rs. 16. For one h. p. from mannual energy being six times costlier as 13 people give that drought power, Rs. 16 x 6-Rs. 96 i e. Rs. 7.50 per day per person will be the rate. Under this

Kumarappa on "Science"

MACHINES AND VIOLENCE

When people say that we, of the non violent school, are against machinery they are uttering a truth in relative setting, Machines are good, but if we have not developed sufficient control over ourselves they will lead us into the paths of violence, into destruction. All this feverish planning, for rapid industrialization based on capital goods imported from abroad is sure to lead us along the way all industrialized countries have gone- on the highroad of violence, imperialism and destruction. Discretion dictates caution. Shall we heed it ? or shall we in our pride of achievement head for a fall ?

DEVELOPMENT OF MAN

- - - No plan is worth the sacrifices a planned economy entails unless it visualises as a whole and provides for the development of all the faculties of man. Man is more than a mere animal to be contended with a well-regulated dairy life of cattle, to be fed, watered and grazed at regular times and sumptuously. We need much more than this and that cannot be merely organising large scale production of goods.

SCIENCE AND DESTRUCTION

Why is it that all science runs a-whoring after violence and destruction ? Is humanity on a downward grade ? Is violence bocoming the life of the world today ? These are some of the questions that should rake our brains.

The development of higher nature of man– Character and personality – is not keeping pace with the advance made by his mental faculty. Man's self control is being lost, relative to the advancement made by science. Science is good, but when it outstrips man's character and upsets the poise, it makes a slave of man and generates violence.

MISUSE OF SCIENCE

- - - But man, in his anxiety to use his knowledge, puts up sugar mills, convert good lands, which may be used for cultivation of cereals, into sugar cane growing lands and then the sugar cane is converted into sugar, wasting the bulk of the minerals and salts in the molasses, which are thrown out as unfit for human consumption and from which he prepares rum and gin to poison the people and to acquire for himself the money they possess. - - - -

LABOUR SAVING DEVICES

The trend of events seems to be such that we shall end by hanging ourselves with " Scientific " ropes. Our governmental machinery appears to be set to destroy the industries of the common man by the introduction of labour-saving devices which may be otherwise termed " employment reducing instruments ". Is it scientific to introduce such in a country teeming with unemployment and under employment ?

MECHANICAL POWER

All centralized industries, which obtain motive power from oil, coal or electricity, are in reality heavily subsidized by the low prices at which sources of power itself is supplied. This unseen exploitation, mainly helped by the government, cannot be tolerated in a real democracy. This type of industrilization is unpardonable when over 1640 crores of man-days are allowed to run awaste through unemployment.

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BAMBOO

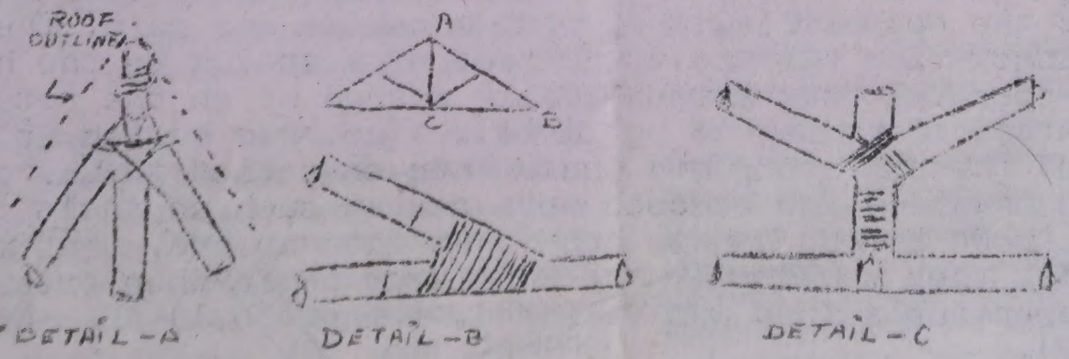
Bamboo pipeline: The little Indonesian village of Kepuharjo have built withtheir own efforts a 90 Kms. network of bamboo pipelines that supplies 60,000 people in 24 villages withenough water to wash, cook and sprinkle over their gardens. Its leader, 32 year old Anton Sudjarwo, is an engineer who launched this project. For 14 months, 300 peasants worked voluntarily on the project.

Bamboo & Cane Development Industry, Jail Road, Agartala-799 007 : works under the All India Handicrafts Board to study the botanical features of Bamboo and cane of different regions of India and their suitability for handicraft works, attack of borer, fungus, moulds etc, on bamboos and to find out suitable low cost chemicals to check the same develop new designs of bamboo and cane handicrafts and popularise them among the artisans. It conducts six months advanced training in bamboo and cane handicrafts for practising craftsman on All India basis.

Bamboo-Cret Housing: Researches conducted at RRL, Jorhat, Forest Research Institute, Dehradun and Central Building Institute, Rorkee; through their experiment to build low cost houses having necessary structural safety and comforts have found bamboo a novel building material. Bamboo can be used as reinforcement in cement concrete for flat as well as sloped roof, seams, stairs, contilevered porticos, sheds, fence posts and electric transmission posts, etc. According to RRL Jorhat a two roomed house with all amenities covering a plinth area of 33 sq.m will cost only Rs.6,000, which is just one half of the similar house built with the conventional building materials like bricks, cement, G.I.Sheets etc.

Some ways of treatment of bamboo for longer life are - pressure treatment - proplyactic treatment or creosote oil application against a possible decay due to termites, fungi and bamboo goods etc. - Mixture of white lead and 10% varnish brushed on bamboo strips - Glose oil has been found excellent inhibitor against any shrinkage and swelling effect on bamboo. (FRI-Dehradun) - Other chemical treatments are : Composition 1 - Arsenic pentocide 1 part; copper sulphate 3 parts; Pottasium dichromate 4 parts; water 20 parts. Composition II: Copper sulphate 4 parts; potassium dichromate 4 parts; Acetic acid 0.25 parts; Water 20 parts. (CBRI-Roorkee).

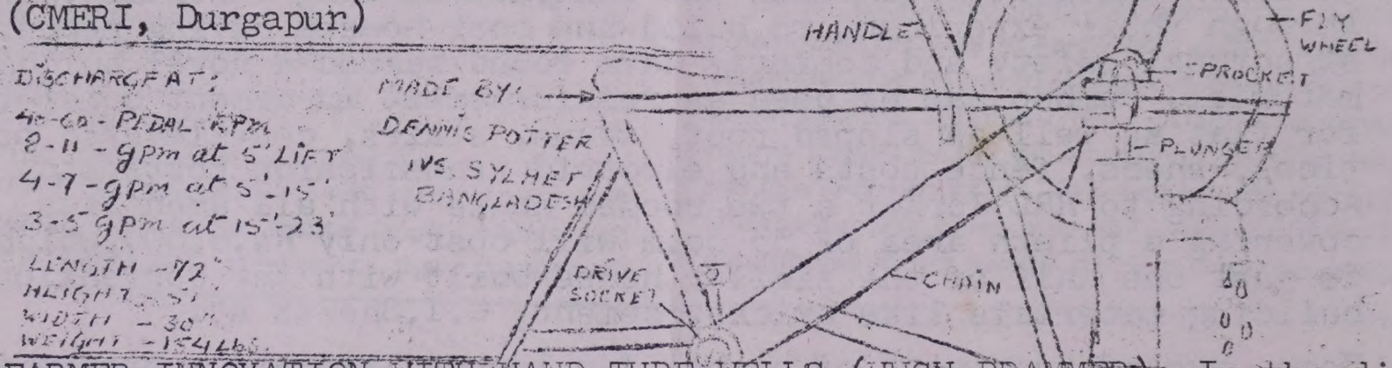
BAMBOO JOINTS IN BUILDING CONSTRUCTION



Pumps

A SELF-ACTING WATER PUMP based on the principle of hydraulic ram has been designed and fabricated at RRL, Jorhat. The pump works satisfactorily at a delivery head 75 ft.height only. This pump could be utilised in hilly regions without any external energy input. (RRL Jorhat)

PEDAL PUMP: The Central Mechanical Engineering Research Institute (CMERI), Durgapur, has developed a manually operated pedal pump suitable for minor irrigation purposes in rural areas.The pump is useful for lifting water from shallow water reservoirs,such as irrigation streams, open channels, ponds and shallow wells. It can handle water with mud and other impurities & has an average discharge capacity of 6000 litres per hour at a head of 6 ft. The discharge takes place twice in each cycle, resulting in continuous flow of water. A farm about half an acre in area can be irrigated in about 8 hrs. The design of the pump is available from CMERI, Durgapur for commercial exploitation. A small industry with a capital investment of Rs.2 lakhs can manufacture 200 units per month. (CMERI, Durgapur)



FARMER INNOVATION WITH HAND TUBE WELLS (HUGH BRAMMER): In the district of Bagra (Bangladesh) farmers are trying various methods to reduce the work involved in hand-pump irrigation. They have adapted their pumps so that they can be operated by foot. As foot operation is more efficient because the operator can use the full weight of his body rather than only his back and arms. The most common method used for foot operation is to attach a short piece of bamboo perpendicular to the handle near its operating end. Efficiency is increased by installing the pumpset deeper than normal so that the handle just clears the ground at the end of the down stroke. Operation is made easier by erecting a strong bamboo frame over the pump which the operator (or operators) can hold on to whole pumping. Some farmers also make a simple shed over the pump to protect the operator(s) from wind sunshine and rain. The most exciting innovation was the attachment of a spring to the handle of a foot-operated pump automatically pushed up on the return stroke instead of having to be lifted. The ends buried in the soil behind the operators and their thin ends tied to the cross bar on the handle. The bamboos were set at such an angle that the down stroke of the handle bent them into an arc, thus flexing them so that they would pull the handle up again when pressure from the operator's foot was released. (Diag. No.1)(ABAB-News March 1980).

Annasaheb Sahsrabudhe

Anna, as we called him, is no more. He breathed his last on 10.3.80 in the hospital in Bombay, where he had gone for a check-up from Sewagram. His demise was unexpected because although he was actively engaged. Coming in contact with Gandhiji at an early age, he dedicated himself to the service of the rural poor for the last sixty years. His endeavour all along had been to find out modes and models which would bring equality and social justice in the society and help the villages of India, drowning under the burden of progressive unemployment, to gain their freedom and prosperity. He personally experienced life of labourer in the village. He worked for organizing occupation of societial change. He took charge of All India Institutions like Sarva Sewa Sangh, Khadi & Village Industries Commission & c. He fought with the government on issues he felt required to be resisted. He cooperated with and assisted the government on plans which he felt essential for the betterment of the common man. All his life he cleared new paths in fields untackled. He was a constant inspirer to all those engaged in experiments for the benefit of the weak. It was his efforts which brought the field of agriculture under the scope of Gandhian constructive work. He always felt that without the basic ground of agriculture no economic growth is possible. He consistently endeavoured to see how the landless and small farmers could come up and be less dependent on big landlowners. He also felt that without rural industrialization, the agricultural economy cannot prosper and as Chairman of the Rural Industries Committee of the Planning Commission during 62 to 65, he tried to bring out such a model He was an institution by himself to whom young and old were attracted. They sought his guidance and traded ideas with him as equals. Anna's departure has therefore left a void which will take a long time before we can reconcile with the fact. We felt he was specially close to Centre of Science for Village and we pay our homage to him with fond memories & deep sorrow.

- Devendra Kumar.

New Literature Received

Appropriate Technology in the Commonwealth :

A directory of institutions. pushisher : Food Production & Rural Development Division, Common Wealth Secretariat, Marlborough House, Pall Mall, London, SWIY-5HX) pp. 64; Price £. 1

A Directory which brings together information (Functions, Programmes, Publications comments etc.) on 75 organizations from 26 countries in the Commonwealth which are working on ' appropriate ' or intermediate technologies.

R & D Institutions in India – A Directory of Addresses

Publisher : Department of Science & Technology, Technology Bhawan, New Mehrauli Road, New Delhi

This 160 paged directory contains names and addresses of 9,671 Scientific Research Institutions under the heads of Central Government, State Government, Private Sector, University, Institutions of National importance and deemed universities.

Directory of Indian Specialists in Energy

Publisher : Tata Energy Research Institute-Documentation Centre, Bombay House, 24 Homi Mody Street, Bombay-400323; pp. 119

The Directory includes Information about 375 individual specialists in Energy (non-depleting and non-polluting sources of Energy) from 175 organizations, giving their names and addresses, significant contribution, current research and publications.

Solar Energy :

The Indian Section of International Solar Energy Society has concised the 450 papers presented in the International Solar Energy congress, held at New Delhi, 16-21 January 1980, in three volumes. Some of the Topics included in the Abstracts are solar radiation, Energy Storage, Photo Voltaics, Photo-chemistry, Photo Biology, Flat plate Collector and concentrating system; Space Heating and architecture; Agricultural and Industrial applications. Publisher : Director (NES), Department of Science & Technology, New Mehrauli Road, New Delhi-29 Price Rs. 2000.

Energy Research reports in Microfilms :

Over 1700 research reports in microfilm which may be obtained on loan for a fixed period from the TERI Documentation Centre are listed in this book (pp. 217)

Bee-keeping in Rural Development

Publisher : International Bee Research Association, Food Production & Rural Development Division, Commonwealth Secretariat, Marlborough House, Pall Mall, London, SWIY 5 HX; pp. 196 Price £ 2.50

A selection of articles on unexploited Bee-keeping potential in the tropics with particular reference to the commonwealth (Specially Brazil, Kenya, Tanzania and India) dealing with research projects, training and production units in this field.

Tree Borne Oilseeds :

Publisher : Director, Non-Edible Oils and Soap Industry, K V I C, Gramodaya, 3 IrlaRoad, Vile Parle (West), Bombay 440056

This 76 paged illustrated booklet gives an estimated statewise potentiality of tree borne oil seeds, giving detailed information on 19 such oil seeds of India. It also gives analytical data on 56 oils of tree origin. This is a good acompilation of useful information on properties of commercial oils used in soap and non edible oil industries (Price-Rs. 10)

Changing Village :

Publisher : (Documentation-cum-clearing House on Rural Development – Gandhi Peace Foundation,

It is an information bulletin (Bi-monthly) providing excerpt of News on different aspects of Rural Development from newspapers and views of social scientists from periodicals

' Environment " : This bulletin brings forth whats on, the news on ecology ! It is an eight paged informative bulletin on Ecology and connected problems, policies and programmes. The friends of Nature and groups working in this direction can get the bulletin free of charge. The editor invites cutting on news and views, on ecology to be sent to him. (Anupam Mishra, Gandhi Peace Foundation, 221/223-Deendayal Upadhyay Marg, New Delhi-2)

Cooking potatoes : Potatoes boiled in their skins lose one percent of their protein; plunged into boiling water after peeling, then boiled, lose eight percent protein. Placed in cold water after peeling, then boiled, lose 15 percent protein, over 18 percent ash and three percent starch.

Rice & Dhal :

CFTRI, Mysore improved methods of harvesting, drying and milling of paddy suitable to rural set up are being demonstrated by CFTRI at Natanahalli, a village near Mysore. Presently the advantage of early harvesting of paddy in preventing cracks and breakage during milling are being demonstrated to select farmers. This is supplemented by the demonstration of a two-phase procedure for farm level sun-drying of paddy developed by CFTRI for obtaining paddy with optimal milling quality and minimum milling breakage. CFTRI has evolved an improved Dhal milling unit by which good quality dhal can be expected to stretch further by minimising processing waste and spoilage.

Edible Mushroom : A highly proteinaceous edible mushroom species has been developed by the National Botanical Research Institute, Lucknow following the discovery of a new pleurotoid fungus, drawing on the living trees of Polyalthia longifolia (Sonn) in the institute campus. Analysis of the protein and amino acid compositions on dry weight basis has shown the mushroom to be specially rich in lysine (7.2%) besides being a good source of other essential amino acids, water-soluble proteins (24.2%) and sugars.

A crusher-cum-juice extractor : It has been designed at RRL, Jorhat for extracting juice fibrous vegatable matters. A prototype model of 25 Kg/hr capecity was fabricated in the work shop. The machine has been successfully used for extracting pineapple juice, it extracts about 80% of juice. (RRL, Jorhat)

Transistor run by Energy from Bio-gas : Dr. J. N. God, Professor of Chemistry in Rajasthan University has succeeded in running a three band transistor on Bio-gas energy. The energy he says is produced by mixing some chemical in to the dung slurry. He is trying to work on dry cells too.

Rock Bees-the Indian bee of promise

The International Conference on Apiculture in Tropical Climates was held in New Delhi in the Ist week of February 80, 80 papers were read on bee-keeping but only two pertained to the unique variety of the wild India bee, found all over the country and having great potentiality of being tapped-the rock-bee.

Dr. Kohinger of Germany read a paper and his work on Rock Bee done in Srilanka on Rock Bee. This is on the same line as the work done by Sri Amritrao Ghatge at Wardha and Indore in 50's and 60's. He is trying to find the ways and means to collect the honey from the wild colonies of Rock Bees so that the bee wealth can be saved, which otherwise is burnt by the villagers who collect honey after burning the colony.

He posed a question before the Indian Scientists-apiculturists that when we have in India Rock Bee colonies, practically every where, and producing immense quantity of honey every year, without any establishment cost and expenses why do we hanker after importing Apis mellifwo and concentrating on only Apis indica etc. He remarked about apiculture research in India that unfortunately most of their work does not have proper priorty and it looks as if it is for the self-development, whereas it should be for the service of the needy." Dr. C. F. Townsend (Ex-Chairman) and Dr. Eva Crane, the Director, Bee Research Association, London, also held the same views as expressed by Dr. Kohinger.

Technical Information Service

"Millions of Trees Clubs", Sira Cate, is a movement now spreading to Tumkur and other areas.

The organisation wishes to extend it self until finally here is a community of five marginal farmers in every taluk of India who are members of this club. These farmers will raise nurseries under the supervision of a member of the organisation. Tree production can become a major rural industry. During the rainy season there will be mass planting of trees of all kinds--trees for fuel, fodder, building material, shade, ornamental trees and fruit trees. Waste and marginal lands will be gainfully employed. The club also wishes it known that trees are now available at their nurseries and a price list can be had by writing to:

Mr. Ben Soans Millions of Trees Clubs C/o Youth Hostels Association of India (South Zone Council) Sira Gate, Tumkur 572101

WORLD ENVIRONMENT DAY IS SET FOR JUNE 5, 1980, reports the Environment Liason Centre, Nairobi, Kenya. The Centre is inviting 7,000 NGO's to partake in a conference dealing with a "New International Development Strategy with appropriate environmental components." The theme will focus on the third developmental decade beginning January, 1980. The Centre plans an international post II cartoon contest and an NGO resource pack for WED. Suggestions and questions should be addressed to : The Envinoment Liason Centre, P. O. Box 72461, Nairobi, KENYA).

SAVE THE HIMALAYA

Today the world is faced with many serious crises in the fields of economics, politics and health, which call for serious thinking. At the root of all these crises is the rapid depletion of natural resources with insufficient supplies of pure drinking water and pure air, combined with decreasing soil fertility, involving the production ot poluted crops.

Every year we are startled by the serious disasters in the Himalayan region. The floods on the Alaknanda in 1970 and Bhagirathi in 1978 and the recurring hurricanes and flow in the plains are outstanding examples of how every year the country suffers crores of rupees worth of irreparable damage. But these are not isolated happenings. Every year damage from increasingly serious, landslides in the hills take a tole of dozens or hundreds of lives of human and cattle, ruins agricultural land beyond recovery and faces us with the challenge of rehabilitation.

These increasingly recurring losses outweigh and will continue to outweigh the apparent financial benefits of development and revenue from our forests.

Forest wealth is the true and lasting basis of any nation's prosperity. It is apparent that it provides the local populace with the basic needs of prosperity- feed, fodder, fertilizer, fuel and fibre, but an even more important function is the preservation of soil fertility, preventing erosion and controlling the flow -of water, thus preserving the water level, not only locally, but throughout the whole river basin. It also maintain a healthy balance between oxygen and CO_2 in the atmosphere, thus maintaining stable conditions for animal and plant life and counteracting the adverse effects of industrial atmospheric pollution. Forests are the main protectors of the environment of the whole country.

Whereas the forest development's estimate is that the proportion of forests in the hill areas should be 60 percent, it is on the whole in the neighbourhood of 30% on paper, but the percentage on the ground is a question mark. Increased local population has also increased the pressure of demand for local necessities, while commercial money cropping has reduced their supply. This process developing over a century has suddenly been accentuated to crisis by the policy of development adopted in our five year Plans.

The policy of artificially planted commercial mono-cropining (mainly conifers) with a clean forest floor, in place of natural mixed forest with a profuse floor covering began the process of soil deterioration and erosion but this is now enhanced by the mass felling of these forests leaving bare and denuded slopes exposed to the relentless rays of the sun and the torrential rains. Erosion is now taking place to such an extent that the flow of muddy water in the Ganges at Haridwar in July is fiftytimes greater than when the flow is clear. The Ganges, Yamuna, Kosi, Sharada, Brahamanputra, Sutlaj, Ravi. etc. are also incapable of accommodating the silt, with resulting recurring disastrous floods in the planes. These catastrophes are not natural, they are man made. We have destroyed Nature's self-regulating powers and must now restore them.

This process is being rapidly accentuated by other factors like- the rapid development of motor roads, the development of gigantic dams, large tracks of forests cleared to accommodate the electric lines, the digging of bunkers for purposes of military defence, etc. etc.

A proper policy of forest development will increase the supply of healthful natural fertilizer and obviate the necessity of large-scale use of artificial fertilizers which are an increasingly heavy financial burden on the agricultural public and which increase soil, water, and atmospheric pollution as well as wind and water erosion and involve large scale inputs of scarce and increasingly expensive fossil fuels. It will also increase the supply of water for drinking and irrigation.

Therefore, it is essential that in the coming election, our policy of hill development especially with regard to forests, roads and dams, should be a main plank of discussion. There appears to be of increasing interest and consciousness in many quarters. The public will be prepared to support candidates who stand for a correct policy of future planning for environmental conservation.

- Sarala Devi -
Hill Ecological Society
(haramdhar Himalaya)

• जो जे वांछील ..... • तो ते राहो ..... • प्राणिजात .....

ज्ञानियाच्या राजानें पसायदान मागितले, ते सर्वांच्याच कल्याणासाठी. कारण "मेत्र जीवाचे" निर्माण होऊन सहकार्याच्या भावनेने आणि परस्पर जिव्हाळ्याच्या भूमिकेतून सारे समाजजीवन सम्पन्न व्हावे हाच उत्कट उद्देश त्यामागे होता.

नेमकी तीच सत्वे सतत जतन करुन, अतिशय जिव्हाळाच्या भूमिकेतून आम्ही सुरवातीपासूनच प्रयत्न मग्न आहोत लघु उद्योगांना प्रोत्साहन देणे त्यांची सर्वांगिन प्रगती साधणे हे आम्ही आमचे परम कर्तव्य मानतो ....

कर्तव्याची ज्योत तेवती ठेवून आम्ही निष्ठापूर्वक प्रगतीच्या दिण्डीमध्ये सामील झालेलो आहोत ....

सर्वांना बरोबर घेवून।

बँकिंग सेवा

★

व्यक्तिगत जिव्हाळा

बँक ऑफ महाराष्ट्र

भारत सरकारचा अधिकृत व्यवसाय मुख्य कार्यालय

लोकमंगल १५०१ शिवाजी नगर, पुणे ५

Formula electricity is cheaper by half then from bullock power 1 h p. of electric-motor for 8 hrs. of work should cost not less than Rs. 8 per day. If such equity is maintained between the various kinds of energy sources man and animal power will get immediate employment & the cheap energy available to some at the cost of many will be eliminated.

Thus it will be clear that generally it is not the efficiency of the techniques of production that is basically responsible for cheapness of goods, produced by highly centralised capital intensive production systems but it is the hidden advantages of the kind enumerated above which are responsible for it. It may be contended that goods produced on the above system of costing of energy will never be able to compte with outside countries. When we maintain our national borders intact, from any intrusion from outside or extrusion from inside, at the stupendous cost amounting to almost one half of the total central revenue of the country under the head of 'defence'. Why should this membrane be allowed to be punctured by private exporters and importers. This privilege should be used solely by the community as a whole which pays for and maintains the borders. And all goods meant for export should be handled by the State. When this is done the selling price of goods produced for exports will have no relation to their internal cost price and being invariably sold at international competitive prices (till the world order becomes cooperative) the difference in the trade can be well absorbed by the nation's economy which because of the new system would be bursting at its seams with the vigour and confidence surging through the productive potentials of the multitude. The big are more efficient incomparison with the small only under a system which gives them many privileges. It would therefore be evident that it is wrong for the 'big' to scoff at the small for their so called lack of competetiveness.

— Devendra Kumar

RESOURCE DEVELOPMENT INSTITUTE (RDI)

RDI is a non-profit, multi disciplinery, voluntary society of professionals and social workeres, managed by its fellows, consultants and scholars, and working on resource development technologies and strategies, for the well being and progress of the people, and is essentially rural or village technology and service oriented. It head quarter is at Bhoal (M.P.) and executive director is Shr. G. G. Puri. It aims at promoting research in applied technological fields by affording scholarships, fellowships and research facilities; Eliciting bright and workable ideas and processing them; promoting development inventions; study and analysis of resources; needs and developing appropriate strategies and technologies, therefor, making expert consultancy services available, formation of projecs, designs prototypes aimed at optimum resource development and supplementing the efforts of ther development agencies.

Its current activities are in :

i) Biogas Technology : a diesel engine conversion kit; a small biogas turbine; high pressure gobar gas plants; a gobar gas filter; substitution of gobar gas in place of acetelene in welding and cost reduction of biogas plants,

ii) Solar energy : A Solar reflector; concentrator, modified sterling engine system (1976); an aqua ammonia–absorber-gas turbine; a village technology oriented solar cooker; a cheap sun trekking attachment and solar cum wind energy convertor.

iii) Others : Autolift Impulse Pumps; a new process of hydrometallurgy; use of waste manganese dust for improvement of soil fertility; use of waste plantain stalk for fabric and fibre manufacture etc. etc.

Address : Resources development Institute
1100 Quarters Area. BHOPAL - 462016 (M. P.)

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SCIENCE FOR VILLAGES

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Whither the Spinning Wheel?

As per Rural Labour Enquiry 1974-75, the estimated number of full days of employment in the rural sector on an all India basis for 64-65 and 74-75 showed a Consistent decline. This trend was evident, unfortunately, both in agriculture as well as in non-agricultural, rural occupations. During this decade, agricultural work for men declined from 208 days in the year to 185 and in non-agriculture from 27 to 25 days. This trend is going on since long and shows no improvement. Its cumulative effect evidently spells hunger and under-emploment to a large number of rural families. It is to change this situation that the Gandhian stress on the role of rural industries has been partially conceded by the Government which has provided for the formataion of Khadi & Village Industries Commission (KVIC) for this purpose.

KVIC :

This Institution is working for the last 3o years in the country. It works for Khadi & 23 rural industries – mostly traditional but some newer techniques like bio-gas, cottage match, non-edible oil etc. have also been included. The uniqueness of its working lies in the fact that it acts as an assisting agency-to thousands of voluntary social work bodies, artisan cooperatives, charitable institutions and local-self bodies like Gram Panchayats - in taking up units of village industries and Khadi to assist the weaker section of the community. KVIC, as a principle, does not help entrepreneurs, traders, business bodies or private profit organizations. It recognises only non-profit service institutions, dedicated for charitable purposes and organizations of artisans, as it svehicles to assist in production of village industries. This model of alliance of service with industrial production is quite unique. The concept of productive work in village industries, being regarded as a charitable function was originally conceived by Gandhiji. This

wanted Khadi to be considered as a trade. Gandhiji at last won his point in the Privy Council of London, which recognised Khadi work as a social service function, though its production figure was in millions of rupees.

AS A LIFE BELT

Herein we are looking to the role of Khadi in the present day state of rural unemployment. However Khadi is not so much a means of gainful employment as it is a means of succour to the poormost who needs to be given some productive work where none other is available. It could very well be a national insurance against hungry days for those living at the level of destitution. The beauty of spinning is that it can be plied in all seasons, in any place and by everyone – young or old. Thus, though meagre in return its multipliability factor is immense. It could be compared to a life-belt thrown to those drowning in the economic sea. However, we have to work for a day when it is least used. Its potentiality lies in the assurance that through its use none would be required to sleep without food. This could be compared with the 'dole' system practised in affluent countries, where those forced to be idle, receive at least one-third of what they would have got on regular employment. Khadi can assure this to the landless labourers and other unskilled unemployed, through spinning, by providing more than one-third of the minimum wage in agriculture to every person in the family who takes to 'Charkha'. Unlike 'dole' where one has to spread his hand for charity, in Khadi the person works in the system of self-help and community cooperation with only marginal assistance from the State.

Let us look at its working. The production of handspun cloth last year touched the figure of Rs. 90 crores. In the current year, if the financial and other inputs are properly provided to this labour intensive work, it will go up to Rs. 100 crores. More

(Continued on page-7)

Do Not Export

Today, in India most of the ores are being exported. We are, therefore, not only losing the opportunities of employment for the people but impoverishing the land. Minerals, like other raw materials, have to be worked into consumable articles and only after that can the commerce part of the transaction commences. Any Government that countenances a foreign trade in the raw materials of a country is doing a disservice to the land.

A Swaraj government will not only organise the exploitation of the raw materials for the people, but will help them to use these in their industries. Here is the rightful place for large scale industries under the controle for the Government.

A steel plant may produce steel bars and plates, but not buckets and ploughs. The latter should be the preserves of the village blacksmith.

Adequate Wages

Man is a machine. If a potter makes pots, the price of the pots should bear all costs including the maintenance-is not merely what keeps him alive but should include sufficient to keep him in a fit working condition; if not the cheap pots will include part of his wasting self. Higher price, when necessitated by the payment of adquate wages, is a thing to be aimed at and no buyer should grudge paying it.

Public Expenditure

Public expenditure will have to be conscientiously scrutinised to see that no pie coming from the poor is spent by government in such a way to exclusively serve the interests of the rich and that every item of expenditure that benefits the rich comes out of adequate contributions made by that class. If this policy is strictly followed it would soon be apparent to what extent the better off classes have been sponging on the voiceless millions as the former will find that they can no longer live as comfortably as they have done so far. If the methods of the present government are continued by the popular ministries, poverty will inevitably increase. One class cannot ride on the shoulders of another class in a free country.

Value differs :

A labourer may earn a rupee by the sweat of his brow and it may represent a day's food for him and his family while the same rupee may represent the value of a cigar to a wealthy man. So if the rupee of the poor man is so used as to be passed on to the rich man than there is a fall in the transfer of values if poor men are taxed and the benefit from taxation goes to the rich there is a loss in national wealth or if poor people buy mill goods and the profits accumulate to the rich mill owners again, there is a loss in values caused by the limitation of money economy.

Distribution of Wealth

Any plan intended for the welfare of the people should have the economic activity of the masses as the centre. Their diet has to be balanced, food grains, vegetables, fruits, gur, milk and its products should have priority over all other production. Industrial and money crops must yield place to these. Plans should allow for the production of a copious supply of all other necessities of the people such as clothing, building materials etc. Production should not, be looked at as an end in itself. Distribution of wealth must naturally be an out come of production.

Distribution-Restricted

Cloth, sugar, oil, building materials etc. Produced by a mill restricts distribution, however much the quantity may be, grater than the production by village and cottage industries. People must produce for themselves by processes easily accessible to them. This should be the centre of all plans. Then should radiate from this, as being accessories to it, all other organised industries. Steel rolling mills will supply the raw materials needed by the village smith. Forests will be planned to supply the needed seasoned timber for the carpenter. The irrigation canals and tanks will water the fields, and village roads will be built with the bullock cart as its patron to meet its needs.

War and Money Economy

If a mill produces consumable articles worth Rs. 10,000 and pays only Rs. 8000 as wages, salaries etc; it means as against a production of Rs. 10,000/ there is put into circulation purchasing power of only Rs. 3000/- Hence, ultimately a great deal of production remains unsold. This causes a depression. To find markets outside and to relieve the depression wars are waged periodically and that completes the trade cycle. Thus wars have become part and parcel of our economic organisation based on a money economy.

Trusteeship

Business transactions do not begin and end with the transfer of goods and payments of money. One buys an article takes it with all moral values attached to the goods. If one buys a stolen article one becomes party to that offence. This is the responsibility and trusteeship of wealth. So it is the duty of every consumer to know the condition under which things he needs are produced. If he patronises goods made under objectionable conditions he becomes a party to it.

From the Laboratories-----

Leaf Cup Making Machine

A machine for making cups (donnay) and plates from dried leaves, developed by CFTRI, has been successfully field tested. Using this machine, cups of different shapes and sizes can be produced from dried leaves, and also from paper, at the rate of 250 cups/hr. A craftsman with a helper can produce about 2000 cups a day (8 hr) and can earn Rs. 18-20/ a day with this machine. A daily production of 800 cups is possible from areca sheath, leading to a net earning of Rs. 20. For better strength and resistance to tear, a combination of dried leaves and paper can be used, giving a laminated structure. For higher moisture resistance, a thin film of polyethylene could be sandwiched between the two layers of the laminate.

The machine costs less than Rs. 3000 and cosumes about 300 W of power. Its adoption in rural and tribal areas, where dried leaves are abundantly available, would help increase the incomes of the economically weaker sections of the population.

(CFTRI-MYSORE)

Cheap Water Filter Device Developed

A low cost water filter set capable of meeting the requirement of pure bacteria free drinking water for an average family has been developed using a special ceramic water filter candle and two ordinary earthenware 'gharas'.

The 'Janata' water filter will be specially usefull during epidemics, floods and drought when supply of pure drinking water becomes an acute problem.

The filtration rate and bacteriological purity of the filtered water have been found to be satisfactory on test at various laboratories. The set will cost about Rs. 25 and can be assembled even in remote rural areas. (CGLRI-CALCUTTA)

Low-cost Weaning Food:

This Low-cost weaning food contains malted ragi powder and malted green gram powder in 70: 30 ratio, its protein content being about 12%. A daily supplementation of 50–75 g of the product compensates for the protein calorie deficiency in children.

The nutritive quality and digestibility of the product are enhanced by malting foodgrains used in the preparation of the product. Optional conditions have been worked out for the operations in malting, viz. soaking, germinating, toasting and dehusking, so as to achieve maximum nutritional advantages. The product costs about Rs. 5/ kg. or about 40 paise a day to feed a child, which is cheaper than commercially available brands of weaning foods.

The product will go a long way in combating malnutrition among infants and children, especially in villages. Preliminary trials have testified to the acceptability and nutritional qualities of the product. (CFTRI-MYSORE)

New Uses of Neem for Pest Control:

Work done at the National Chemical Laboratary (NCL) Pune, has shown that a certain fraction of neem extract can completely prevent egg laying by some insects on treated surfaces. It has been established that oviposition (egg laying) deterrence is due to components which are neither antifeedant nor repellent as earlier believed. The application of either the crude fraction or the active components complety prevents egg laying on treated surfaces by the potato tuber moth for 7–9 days and by some species of mosquitoes for 2–3 days. It is the larva emerging from the egg which is the injurious stage, in the case of the potato tuber moth and similar insects (for example butterflies and moths). Since some of these are very serious pests of agricultural crops, prevention of egg laying by them on crops or stored commodities can provide almost total protection from insect damage.

The NCL findings have clearly identified new neem products with a more effective dimension of activity which, by themselves or in combination with other known components of neem, could provide safe and environmentally acceptable pest control agents of tomorrow.

Dust Extractor

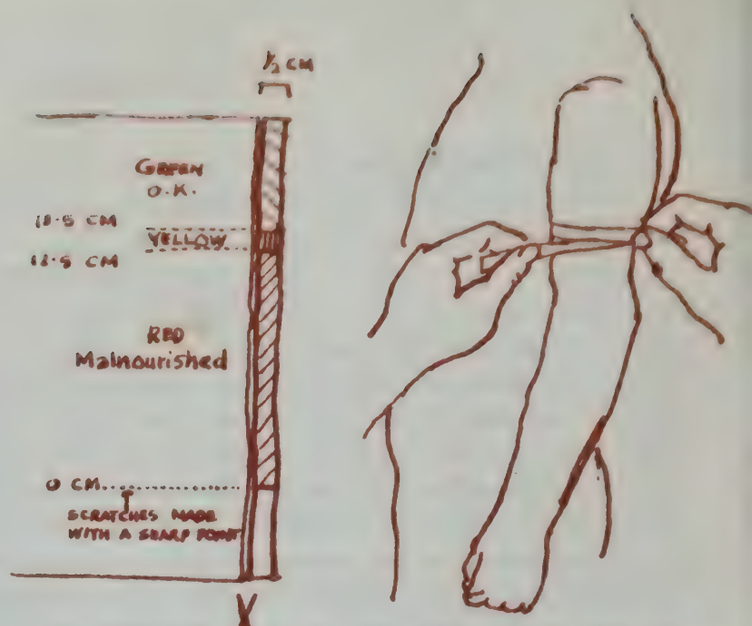
Penumoconiosts, a disease caused by inhalation of inerespirable dust, is an occupational hazard for the mining community all over the world. Drillers are prone to the disease to a greater extent as they are subjected to the high concentrations of airborne dust. Drilling produces 10 to 30 kilograms of dust per coal face. A part of the dust gets airborne during drilling and another part gets airborne during subsequent blasting and other operations.

The Central Mining Research Station (CMRS), Dhanbad, has developed a dust extractor which collects and conveniently disposes of more than 99% of the total dust produced during drilling, and reduces 85% of the airborne respirable dust at the drilling face. The dust level at the drilling face is reduced to well below the perimissible safe limits (650 ppcc).

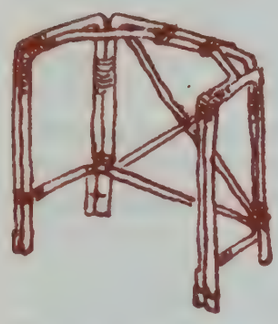
Designed to suit the aptitude of the miners and the mining conditions, the device has a drill rod that passes through the dust extractor during drilling. The dust produced during driling is conveyed by the screw action of the drill rod and is collected in a bag through a side port. The device is handy and the spares are cheap, readily available and easily replaceable.

THE SHAKIR STRIP

The Shakir strip is a coloured armband designed for children(between the ages of one and five), to find out if or not they are well fed and healthy. The strip is made from ½-1 c.m. of cleaned X-ray film which is marked with felt tip pens. To measure where the child stands in the nutrition range, the film has to be placed round the middle of the upper arm. The figure No.1 shows how to make and use it.



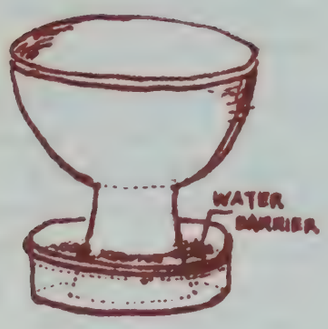
AID FOR DISABLED TOTS



Simple equipments for use by handicapped children are designed by Miss J.K.Kutti,Malaysia, from locally available raw material which are easy to maintain and repair, suitable to local ways of living. Some walking aids designed to enable the user to reach a standing position easily from a sitting position on the floor are illustrated in the figure No.2. The report 'Ratten and Bamboo'(Wildhanger, Amberley, Arundel, Sussex B N 8 9 NR, United Kingdom), consists of working drawings with details of materials and measurements for making simple equipments for handicapped children.

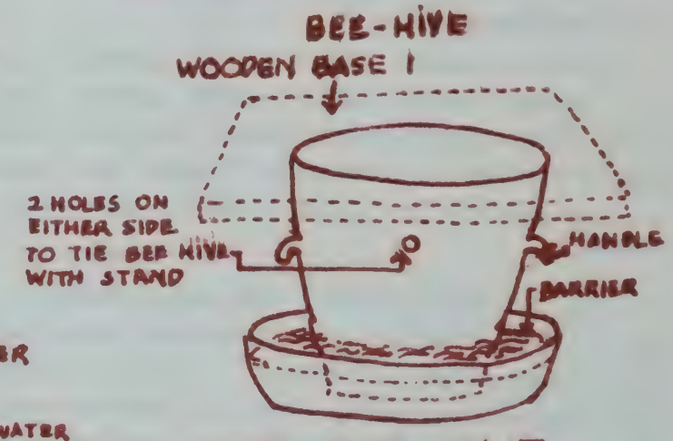
ANT-PROOF STANDS IN TERRA COTTA

by K.R. Subbaraman , Kerala .

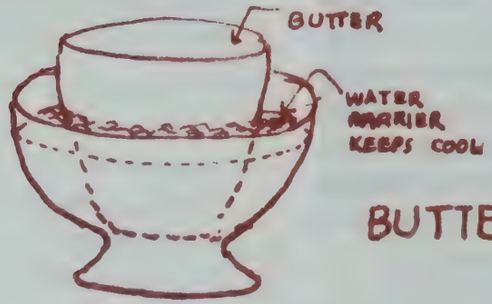


FOR FOOD

FOR COT-LEGS



FOR BEE-HIVE

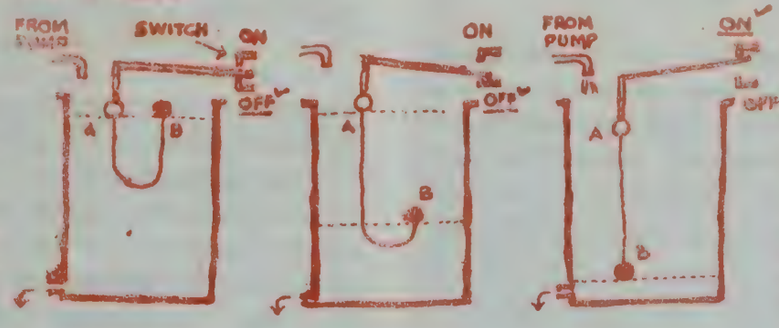


BUTTER-CUP

AUTOMATIC SWITCH FOR WATER TANKS

It has been found that in case of ordinary floating switches, even a small decrease in the water level in the tank causes the pump to operate which means that it is switched 'on' and 'off' a number of times within a short period. To overcome this problem, a new type of floating switch is suggested here, which will operate the pump only when the tank is nearly empty and stop it automatically when the tank is full.

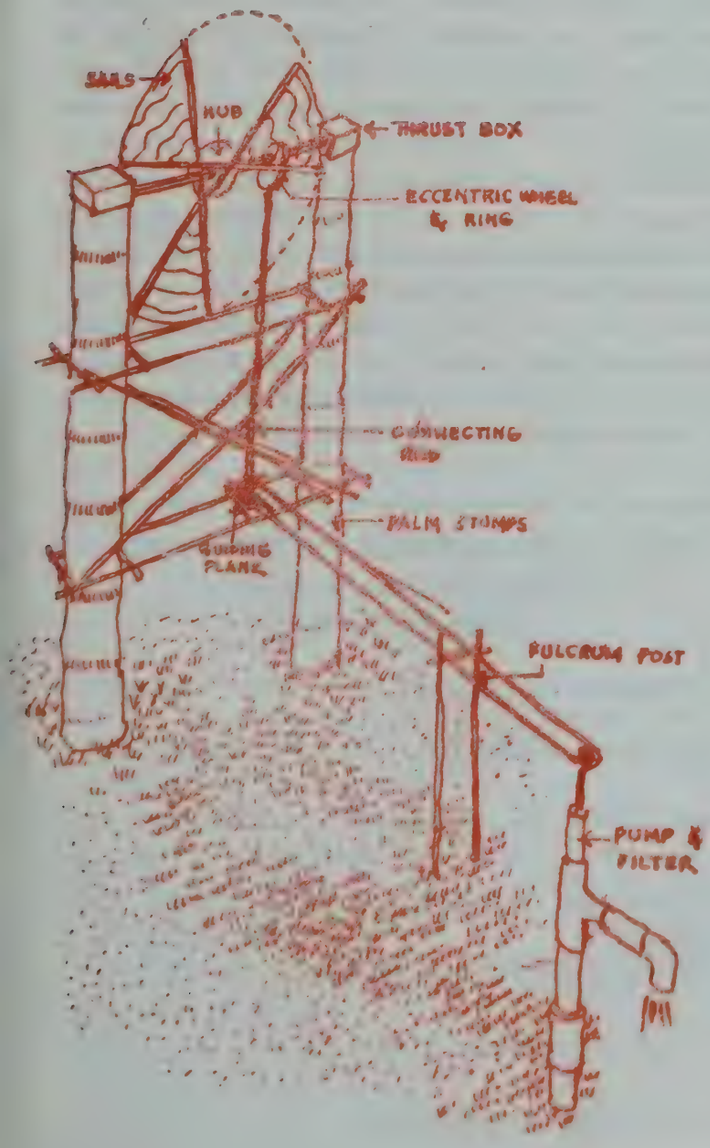
It comprises two floats A & B attached to each other by means of a string, one of the floats (A) is kept on the lever. When the tank is to be filled, weight of float (A).



With decrease in water level, the float (B) goes down and, when the tank is near empty, its weight acts on the lever, putting on the switch and causing the pump to operate.

(Pramod & Sudarshan, Hosathoto House, [illegible] 522)

LOW-COST WINDMILL



* Anila-1 is a horizontal shaft sailwing type windmill of an entirely new design, particularly suitable for coastal locations. It can be fabricated from local materials, by local artisans, at an estimated cost of Rs. 1,500 (materials, including simple plunger pump, Rs. 1,100; construction and installation Rs. 400).

* Anila-1 can deliver 2,000 litres of water per hour at a total lift of 8 metres in 25 km/hr wind and can work for at least 12 hr/day, nonstop. At least five of these windmills, installed in some villages near Madras during the last more than a year, are at present working satisfactorily.

* The inventors have offered the design knowhow of Anila-1 (patent applied for) free of charge, as a public service, to all those interested in its utilization. However, they would like to be kept posted about the various uses to which it is applied.

* Designed and developed by Prof. C.V. Seshadri & Sri. A.M. M. Murugappa Chettiar Research Centre Tharamani, Madras 600[illegible]

SOME EXPERIMENTS

Solar Still for Drinking Water from Sea

A working model of a multisurface solar still which can desalt saline water using solar energy can be made at a negligible running cost.

The still is most suitable for use in those areas where fresh water supply is insufficient but saline water is available in plenty. Four litres of fresh water can be obtained per square meter of the still per day during bright sunny days and 1.5 litres during cloudy days. The fresh water produced is free from bacteria and has no dissolved salts. A battery of stills can be set up, depending upon the drinking water requirement and the available terrace area of the building.

The materials used for constructing the still are cement concrete bottom slab, ordinary window glass panes, nylon threads and channels of galvanized iron sheet or stainless steel. The initial cost of construction of the still is about Rs. 300 but it could be reduced with the prefabrication of its components.

Interested parties may contact Shri S. P. Anand, Scientist, National Institute of Oceanography, Dona Paula, Goa. 403004.

Algal Production Project.

The Mobile orientation and Training Team, Bishops House, Kunkuri, Dt. Raigarh, M. P. involved Drann (tribal) farmers in the area in an algal production project trials were undertaken on 47 plots in 8 villages. Beds were dug 10' long 3' wide and 10" deep. A plastic sheet was laid along the bottom and sides to prevent seepage. The bed was covered with 2" of loam and 4" of water. Stones were placed along the sides and water was trickled over them so that the soil remained undisturbed. Two handfuls each of superphosphate and algae were sprinkled over the water. The level of water was kept constant. On the 20th day a rich bloom appeared. Thereafter the bed was allowed to dry and the algae scrapped off (A portion may be kept as seed material for the next season – ensuring that no moisture remaines, Of the 47 locations where multiplication efforts were made, 33 proved successful.

Two field experiments were carried out to demonstrate the advantages of transplanting and algal use. In the first experiment of transplanting was done in the control and treated plot. Algae was added at the rate of 5 kg. The treated plot registered an increase of 130%. In the second experiment, two plots of even size were chosen.

In the controled, plot paddy was seeded by the broadcast method while in the treated plot transplanting was done and algae was added at the rate of 7.50 kg. per acre. The treated plot yielded 700 kg. to the controls 250 kg. No artificial means of irrigation were employed. While transplanting was done spacing was irregular.

(AFPRO-NEWS -April-1980)

RURAL TECHNOLOGY CENTRE,

The National Chemical Laboratory (NCL), Centre for the Application of Science and Technology for Rural Development (RDC), Pune has been in existence since last October and is gradually establishing itself as a screening, referral and development agency for rural technology. The centre is headed by Dr. B. D. Tilak, former director of NCL. The first six-monthly report of the centre listing various stages of activity taken up so far, has recently been rele sed. A number of projects have been taken up by this centre. These include water evaporation control, the use of water evaporation refartants in paddy fields, the cleaning of tubewells clogged by calcium and magnesium salt deposits, with the aid of an NCL cleaning composition; providing iron-free drinking water to villages in the iron-ore belt as Chandrapur, as well as turmeric, cabbages and virus-free sugarcane and papaya; the transfer of salt from lakes and reservoir to fertilizer fields. The use of neem cake urea blends as fertilizer, the development of small and cottage industries; increasing the durability of cheap cotton fabrics; and experimenting with a new approach for effecting fuel economy in the concentration of sugarcane juice.

RURAL TECHNOLOGIES TRANSFERRED

Processes released to industry

(January-March 1979)

Process & Laboratory	Terms
1. Cattle licks (CSMCRI)	L. Rs. 500 (Technical aid)
2. Tartaric acid from tamarind leaves (RRL., Jt.)	L. Rs. 5,000 R.2½% NE (10 years)
3. Sesame seed, dehulling (CFTRI)	L. Rs. 10,000 R. Nil NE (14 years)
4. Table and dairy salt (CSMCRI)	L. Rs. 1,500 Rs. Nil NE (10 years)
5. Tamarind powder (CFTRI)	Rs. 5,000 (technical aid)
6. Lime sludge based masonry	L: Rs. 2,000 R. 2% NE (10 years)
7. Solar stills, design (CSMCRI)	Rs. 50 (technical aid)
8. Water filter candles (CGCRI)	L. Rs. 1,500 R. 3½% NE (14 years)

Whither the Spinning Wheel ?

(Continued from page–1)

than 1/3 of this amount goes as labour charges to whom even such low wages are welcome. About 10 lac such people, 2 lac whole time and 8 lac part-time, are assisted by Khadi production to–day. If we want a universal coverage of Khadi production to enable all villagers who would go hungry on a particular day, to be provided with some relief through spinning, we would have to give an expansion and distinct direction to this work. we will have to provide at the rate of one Ambar spinning frame of four spindles, for every ten families in village. Thus ten Ambar Charkhas will be required in a 100 family (5-600 population) village. The village school could be given the charge of this section to provide work for those who at a particular time have no work or food and would consequently go hungry. For asking them to spin along with other members of their family during their critical days, the unit would keep cotton slivers and the Ambar charkha for the spinners. Those who spin will be paid as per the amount of yarn spun by them during the day. Spinning 8-12 hanks for 25 paise per hank a spinner can get Rs. 2/– to Rs. 3/– in a day.

NONE NEED SLEEP HUNGRY

For ready disposal of the yarn spun, it could, be sold to the handloom weavers at the price of th e mill yarn. There will no doubt be a defieinite loss, in this transaction. This loss however should, be met through iocal contributions, grants from the Panchayat and Government aids. For eliminating hunger, on our march towards removing poverty, this is an essential step. Khadi Commission could take up this task but then it will have to work on a scale much larger than today's. Out of roughly 14 crore families in the country, one fiftieth i. e. 28 lac families would need such help, some time or other in the year. This would require tripling the present number of charkhas and distributing them in a way that only the most needy avail of them. It would not be wrong to repeat that the earlier we can do away with the need of such relief through Khadi, the better it will be. But till there are families who have to go to sleep without food, they will claim our first priority for helping them through Charkha - the spinning wheel.

— Devendra Kumar

News & Views

Rich Crop in Saline Soils

Saline soils in Kerala lying in the southern–most part of the Indian Peninsula have been formed as a result of intrusion of saline water from sea through backwaters it is found in Ernakulam and Cannanore districts of Kerala to the extent of about 28,000 hectares. An ingenious method of rich cultivation is being practised in this type of land. During February-March the top soil is made into mounds one metre in diameter and one-fourth to three–fourth of a metre in height. With the onset of the south-west monsoon the salinity is washed off from the mounds of the water and the fields will become sweet due to monsoon floods. Germinated seeds are sown on the top of the flattened mounds. For sprouting, the seeds are packed in green banana leaves and tightly covered by coconut fronds. These bundles are immersed in fresh water ponds for 12 hours after which they are removed and stored in shade. When weather conditions become favourable for sowing, the bundles containing the seeds are resoaked for another six hours. A maximum of 30 days interval can be given between two soakings, after which the seeds will not give satisfactory germination.

When the seedlings are 30 to 35 days old the mounds are dismantled and pieces of soil with 3 to 4 seedlings are cut and distributed throughout the field. The field will now look as if it is a transplanted one. No manuring is usually resorted to. The crop is ready for harvest in October-November and by now the salinity in the field increases due to intrusion of saline water. The yield varies from 500 kg to 800 kg per hectare.

(Abstract from INDIA FARMING Nov. '79)

Cycling The Easy Way :

P. C. Dad has invented a labour and time saving machanism in the normal cycle. His 'cyking'-the cycle has an ingenious coiled spring mechanism which stores part of the paddle energy and drives the cycle, without recourse to continuous paddling. The main wheel (fixed wheel) is connected to a free wheel and which has the steel round coiled spring, the spring then reconvertes this potential energy into mechanical energy and the cyclist can sit back while the cycle moves on. Usually it requires around 500 paddles worth of energy to take a cycle half a mile. Mr. Das's invention cuts the paddlings down to 66 only. This is what is meant by appropriate technology.

(Indian Express 15-4–1980)

Saving the trees

In Shyampur block near Rishikesh (Hardwar) a village woman. Smt. Digambari Devi has launched a unique movement for saving the trees. She has organised women in seven villages not to go to the nearby forest to cut tree wood as the usual practice all over the country is. She asks the women to take a pledge that for over one year they would not harm the trees for their fuel wood and will only collect the dry fallen twigs. The women have also appointed from amongst themselves guards who will keep watch on the preservation of green trees. The effect of this self appointed group for preserving the forest has been very healthy and effective.

SOME EXPERIMENTS

Solar Still for Drinking Water from Sea

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The National Chemical Laboratory (NCL), Centre for the Application of Science and Technology for Rural Development (RDC), Pune has been in existence since last October and is gradually establishing itself as a screening, referral and development agency for rural technology. The centre is headed by Dr. B. D. Tilak, former director of NCL. The first six-monthly report of the centre listing various stages of activity taken up so far, has recently been rele sed. A number of projects have been taken up by this centre. These include water evaporation control, the use of water evaporation refartants in paddy fields, the cleaning of tubewells clogged by calcium and magnesium salt deposits, with the aid of an NCL cleaning composition; providing iron-free drinking water to villages in the iron-ore belt as Chandrapur, as well as turmeric, cabbages and virus-free sugarcane and papaya; the transfer of salt from lakes and reservoir to fertilizer fields. The use of neem cake urea blends as fertilizer, the development of small and cottage industries; increasing the durability of cheap cotton fabrics; and experimenting with a new approach for effecting fuel economy in the concentration of sugarcane juice.

RURAL TECHNOLOGIES TRANSFERRED

Processes released to industry

(January-March 1979)

Process & Laboratory	Terms
1. Cattle licks (CSMCRI)	L. Rs. 500 (Technical aid)
2. Tartaric acid from tamarind leaves (RRL., Jt.)	L. Rs. 5,000 R.2½% NE (10 years)
3. Sesame seed, dehulling (CFTRI)	L. Rs. 10,000 R. Nil NE (14 years)
4. Table and dairy salt (CSMCRI)	L. Rs. 1,500 Rs. Nil NE (10 years)
5. Tamarind powder (CFTRI)	Rs. 5,000 (technical aid)
6. Lime sludge based masonry	L: Rs. 2,000 R. 2% NE (10 years)
7. Solar stills, design (CSMCRI)	Rs. 50 (technical aid)
8. Water filter candles (CGCRI)	L. Rs. 1,500 R. 3½% NE (14 years)

Whither the Spinning Wheel ?

(Continued from page–1)

than 1/3 of this amount goes as labour charges to whom even such low wages are welcome. About 10 lac such people, 2 lac whole time and 8 lac part-time, are assisted by Khadi production to–day. If we want a universal coverage of Khadi production to enable all villagers who would go hungry on a particular day, to be provided with some relief through spinning, we would have to give an expansion and distinct direction to this work. we will have to provide at the rate of one Ambar spinning frame of four spindles, for every ten families in village. Thus ten Ambar Charkhas will be required in a 100 family (5-600 population) village. The village school could be given the charge of this section to provide work for those who at a particular time have no work or food and would consequently go hungry. For asking them to spin along with other members of their family during their critical days, the unit would keep cotton slivers and the Ambar charkha for the spinners. Those who spin will be paid as per the amount of yarn spun by them during the day. Spinning 8-12 hanks for 25 paise per hank a spinner can get Rs. 2/– to Rs. 3/– in a day.

NONE NEED SLEEP HUNGRY

For ready disposal of the yarn spun, it could, be sold to the handloom weavers at the price of th e mill yarn. There will no doubt be a defieinite loss, in this transaction. This loss however should, be met through iocal contributions, grants from the Panchayat and Government aids. For eliminating hunger, on our march towards removing poverty, this is an essential step. Khadi Commission could take up this task but then it will have to work on a scale much larger than today's. Out of roughly 14 crore families in the country, one fiftieth i. e. 28 lac families would need such help, some time or other in the year. This would require tripling the present number of charkhas and distributing them in a way that only the most needy avail of them. It would not be wrong to repeat that the earlier we can do away with the need of such relief through Khadi, the better it will be. But till there are families who have to go to sleep without food, they will claim our first priority for helping them through Charkha - the spinning wheel.

— Devendra Kumar

News & Views

Rich Crop in Saline Soils

Saline soils in Kerala lying in the southern–most part of the Indian Peninsula have been formed as a result of intrusion of saline water from sea through backwaters it is found in Ernakulam and Cannanore districts of Kerala to the extent of about 28,000 hectares. An ingenious method of rich cultivation is being practised in this type of land. During February-March the top soil is made into mounds one metre in diameter and one-fourth to three–fourth of a metre in height. With the onset of the south-west monsoon the salinity is washed off from the mounds of the water and the fields will become sweet due to monsoon floods. Germinated seeds are sown on the top of the flattened mounds. For sprouting, the seeds are packed in green banana leaves and tightly covered by coconut fronds. These bundles are immersed in fresh water ponds for 12 hours after which they are removed and stored in shade. When weather conditions become favourable for sowing, the bundles containing the seeds are resoaked for another six hours. A maximum of 30 days interval can be given between two soakings, after which the seeds will not give satisfactory germination.

When the seedlings are 30 to 35 days old the mounds are dismantled and pieces of soil with 3 to 4 seedlings are cut and distributed throughout the field. The field will now look as if it is a transplanted one. No manuring is usually resorted to. The crop is ready for harvest in October-November and by now the salinity in the field increases due to intrusion of saline water. The yield varies from 500 kg to 800 kg per hectare.

(Abstract from INDIA FARMING Nov. '79)

Cycling The Easy Way :

P. C. Dad has invented a labour and time saving machanism in the normal cycle. His 'cyking'-the cycle has an ingenious coiled spring mechanism which stores part of the paddle energy and drives the cycle, without recourse to continuous paddling. The main wheel (fixed wheel) is connected to a free wheel and which has the steel round coiled spring, the spring then reconvertes this potential energy into mechanical energy and the cyclist can sit back while the cycle moves on. Usually it requires around 500 paddles worth of energy to take a cycle half a mile. Mr. Das's invention cuts the paddlings down to 66 only. This is what is meant by appropriate technology.

(Indian Express 15-4–1980)

Saving the trees

In Shyampur block near Rishikesh (Hardwar) a village woman. Smt. Digambari Devi has launched a unique movement for saving the trees. She has organised women in seven villages not to go to the nearby forest to cut tree wood as the usual practice all over the country is. She asks the women to take a pledge that for over one year they would not harm the trees for their fuel wood and will only collect the dry fallen twigs. The women have also appointed from amongst themselves guards who will keep watch on the preservation of green trees. The effect of this self appointed group for preserving the forest has been very healthy and effective.

Carpenters & blacksmiths in Wardha Block

1. Wardha block (population 1,62,803) is one of the three development blocks of Wardha tehsil in Wardha district. The block consists of 110 inhabited villages and the Wardha town (popu. 69,037). The largest distance to any village from Wardha town is 21 Km and no village is more than 8 Km. to the transport system. The Madras - New Delhi and the Bombay – Howrah railway lines meet at Wardha station and proceed to Nagpur where they again bifurcate to New Dehli and Calcutta.

2. The villages in the block could be more or less divided according to influence areas of the following sub-centres :

(1)Wardha with 37 villages (2) Waifad (popu. 2754) 18 villages (3) Anji (popu.- 3720) 20 villages (4) Waigaon (popu. 4,136) 17 villages (5) Kharangana Gode (Popu. 1102) 10 villages.

3. Roughly 40% of the villages have a population of less than 500, 31.8% having population between 500 and 1000 and 30% with population above 1000. However, the distribution of population between these categories is 11% in the small villages, 27% in middle villages and 62% in big villages. It seems that in India the transfer of population to the bigger urban cities may not be as speedy but migration from smaller villages to bigger villages is quite rapid.

4. For the purpose of survey six groups of artisans were identified : Carpenter (290), Leather Worker (93), Brick & Tile makers (280), Potters (76) and Broom & Basket makers (134). Thus the total artisans in the 110 villages came to 1039. The distribution of these artisans is thus, 10% of the big villages have half the artisan households and 31 big villages have 73% of their number. The survey shows that approximately for every 70 families there is one carpenter, for 123 families one blacksmith, 200 families one leather worker, 250 families a Potter, 150 families a Broom and Basket maker and one Tile and Brick maker for 100 families.

5. Only 10% of the Carpenters have work for all the year round, 40% from six to ten months and the rest 50% have less than six months of work in a year. Out of 127 blacksmith households 24% are engaged all the year round; 31% have work for 8 months and another 31% work for only 6 months in a year; 14% have less than 6 months work a year.

Villages with population 1000 and above have 50% of the carpenters and over 70% of blacksmiths. Generally carpenters and blacksmiths work on contract basis and annually get a fixed amount of grains during the harvest period. The average monthly income from carpentry and blacksmithy work is around Rs. 200/- per artisan including grains. About 60% of the carpenters work infront of their houses in public places. The others have some open place of their own and most of them have no sheltered work place during rainy season. A few blacksmiths, however, have some sheltered work place in their own living rooms. The carpentry service provided in rural areas consists of repairs and replacements of wooden agricultural tools and implements, construction of roofs, doors and windows for rural houses, construction of bullock carts and their repair work and furniture making. Wooden plough are used for the cultivation of over 1.2 lakh acres. In this way one carpenter services cultivation on average of about 317 acres. Out of the 284 carpenters households know building construction, 91 households have skills to make bullock carts and 77 households have knowledge of furniture making.

The blacksmithy types of jobs as repairs in iron ploughs, job required for building construction and bullock carts preparation. No iron plough in the block is made by any blacksmith. Out of the 127% blacksmith households 126 households know repairing of agricultural iron implements, 63 blacksmiths households can manufacture iron tool parts. The remaining one blacksmith household claims that it can make iron furniture.

In short we find that :

1. The carpenters and blacksmiths have only traditional skills.
2. Due to machine-made articles many of the traditional skills are losing ground specially for smithy work.
3. Due to decrease in demand for these artisans skills, many of them are compelled to look for other employment opportunities.
4. Their survival in this trade needs new skills, new tools and machines and educational facilities.
5. Some of the younger generation are eager to learn workshop skills for employment in cities.
6. Some items of production of processes may have to be earmarked for rural artisans together with assured supply of raw materials under a camprehensive area development plan.

[on the basis of the survey made by Sri. Kanak Bhai on behalf of sevagram Ashram Pratishthan]

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SCIENCE FOR VILLAGES

Food Science & Technology Information Service
C F T R I MYSORE

Vol III No. 9 June 1980

TECHNOLOGY FOR THE MASSES-HOW DIFFERENT & DIFFICULT

Researches in pure and applied sciences are complementary. Technology cannot move forward without the backing of pure sicence and the latter requires the incentive and placing of priorities by the former. Both were guided by the values man cherished at various periods of his growth in history. In our times the discovery of mineral energies gave a boost to centralised modes of production which are capital intensive and sophisticated. This lead to accumulation of wealth in a few hands and to the further augmentation of disparity between the few and the many, both within a nation as well as between the nations of the globe. Now a stage has come when the demand of the time is that S & T should be so evolved that it :

(a) does not aggravate the yawning gulf between the affluent and the poor of the world.

(b) does not utilise the resources of Nature in a way as to disturb the symbiotic eco-balances.

(c) arrests the rapid depletion of non-renewable treasure troves and

(d) gives man fuller expression of his self, through the productive systems.

Applying these tests to the researches in our own S & T labs we find that the right orientation in the above direction is yet to fully manifest itself. The immediate constraints under which they are traditionally working are very pressingly in favour of the commercial interests. These could not be in consonance with the rational national policies of the time which fulfil the above mentioned criteria. Under the circumstances there is very little incentive for our labs to take up work other than what is dictated by the organised sector.

The big question :

Difficulties erupt even in the small field where despite the normal trend, the labs try to evolve some techniques appropriate for the poor, because such techniques remain ad infinitum on the shelf. When there are no takers of their techniques it dampens the enthusiasm of those who make bold to undertake the non-traditional approach. The labs then feel difficult to further such non-commercial rural techniques, when they find that these have no clients. It is therefore necessary that such technologies yield early results only then the labs will come forward to work in the new direction. Let us analyse the causes of this phenomenon of non-utilization of techniques and how to remedy it. We find that there is qualitative difference between the use of techniques as bring profit to the entrepreneur investor and those which will bring social good but may not yield large individual profit. Let go the margin of profit, in the latter category the units of production hardly provide enough remuneration for those engaged in it. But the number of people who benefit from them is many times more. It is their universality of multipliability that determines the appropriateness of these techniques. This demands that they do not employ resources of material and energy as are not easily available to all, as well as are not exploitative of Nature. Hence these techniques employ low capital, low energy, low sophisti-

(Contd. on Page-2)

Kumarappa Literature For Sale

A few copies of the following Kumarappa Literature are available :

practice & Precepts of Jesus	. . .	Rs. 1.50
Public Finance & Our Poverty	. . .	Rs. 1.50
Why the Village Movement (E & H)	. . .	Rs. 2.50
Cow in our Economy	. . .	Rs. 0.27
Kumarappa - a biography	. . .	Rs. 0.25
Gram Udyog Patrika (1939-1946)	. . .	Rs. 20.00

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Contd. From Page-1

cation and naturally generate relatively low profit. The moneyed man, therefore, is just not interested in them. And the moneyless for whom the technique is intended are neither in a position to be aware of such means nor even if they are,do have the necessary initiative and risk taking capacity to try them out. In contrast to a commercially beneficial technique where the industrialists/commercialists themselves are running about to find out from the labs to get hold of any invention with potentiality of private profit; in the case of the technology to the masses, the techniques are to be taken to them. For this there is no provision in the present system. How to bridge this gap between the portal of the scientific lab and the door of mud hut is the big question.

The Answer :

We, therefore, require such agencies as would help by –

(a) identifying such techniques as are available with rhe various labs.

(b) experiment upon them under village conditions to prove their technological viability in the field.

(c) adapting them to rural conditions.

(d) working hard and with patience to convert the techniques into trades and the processes into professions for the masses.

(e) undertaking work in specific rural areas of introducing such new means of occupation which utilize the new techniqnes.

Examples :

A few examples may be good to illustrate the kind of appropriate trades that S & T can generate and the kind of difficulties they face.

Biogas 'Walla' – The artisan groups of 4 or 5 who construct, maintain and service the biogas plants. (So far gas plants could not be multiplied as fast and wide as chaff-cutters because there is not enough profit for the middlemen in its multiplication).

Lime Pozzolana Cement Makers :

Here too, those who will make lime, slake it, or collect ash either of rice husk or fly ash, etc. grind it in ball-mill, pack and sell it, can only make enough to sustain themselves but cannot allow any dividend on capital.

Leaf-cup by CFTRI Machine :

This has not been able to take off because the machine is too costly for the existing artisans and a method of bankable loan proposal for them has not been worked out nor are the risks involved, covered. Thus we have a good technique but it has yet to be adapted to a trade.

Similarly the non-erodable mud plaster, fire resistant thatch roof. soak pits for household effluents etc. etc. are very useful techniques but being useless for the investor are not taken up by the classes and having not become a trade for the poor are not in a digestable state for the masses. Thus to give feet to a technique to take it up to those in need, we require post-lab technology transfer operations. The model for this process is yet to fashion itself. Centre of Science for Villages is no doubt a small attempt in this direction but we need many many such agencies.

— Devendra Kumar

FROM THE LABORATORIES

Bullock-Cart : Modernization of bullock cart can help 15 million animal drawn vehicles of India having a total investment of Rs. 3,000 crores and employing 1.6 million people. Many designs are being put forth by various institutions. One of them is from the institute of Design, Ahmedabad. This has three comparatively small wheels; the animals are not burdened with the entire load, but only required to pull the cart. The two rear wheels are pneumatic while the front wheel is solid. The hubs and spokes are of wood. The existing hubs can be used as they are, or can be turned smaller. Similarly, the spokes can also be made from old wooden wheels. The steel rim is fitted over the spokes. The hub has two conical roller bearings to minimise friction.

The axle beam is a steel pipe fitted with wooden cylinders at both ends. The card frame consists of three longitudinal wooden beams bolted to the axle beam. The front wheel acts as a guiding wheel. It has wooden spokes and fabricated steel rim, over which a solid rubber tyre is fixed. This can be easily made from an old rubber tyre by cutting off the side walls.

The yoke beam is attached to the front wheel. The yoke beam and the draw bar together are free to move in three planes, reducing the load and injurious effects on the bullocks considerably. The other problem is damage to the hoofs on rough grounds. The traditional solution is to nail metal shoes on to the hoofs. But observations revealed that the metal shoes slip on paved roads and are dangerous on wet roads. To avoid this, rubber pads from pieces of old rubber tyre are fixed to the hoof. The total cost of the new bullock cart would not exceed that of the existing one.

Cotton stalk utilization : Cotton stalk can be used for making particle-board; cotton leaf for extracting vitamin C; cotton seed for processing hydrogenated fats, fatty acids and cakes; cotton linters as source of cellulose; and cotton cake for solvent extraction of oil, leaving a residue that can be used as animal feed. The necessary technology for integrated production of cotton cut lints, crude refined oil, soapstock fattyacids, de-oiled cake, edible flour, and tailings has been developed. The 'chemical cotton' thus produced is used for a series of chemical derivatives from which are manufactured rayon, plastics, protective coatings, films and foils. The cotton seed is converted into edible flour and other products by pre-processing and solvent extraction method. The crude oil is refined and the soapstock obtained during refining is converted into fatty acids. The hulls are compounded into cattle feed.

Solar pumps for small farmers

Scientists atthe Water Technology Centre (WTC) of the Indian Agricultural Research Institute (JARI) have found the experiment of irrigating wheat crop over a small area during the rabi season with a small solar pump quite promising. The pump under test at the WTC was supplied by the IDL Chemicals Limited, an Indian company with collaboration from the Solar Energy International, U. K.

The spokesman said the price of the pump could be brought down to Rs. 6,000 for the entire system if the production level of 1,00,000 units a year could be achieved.

The IDL, he said, would manufacture for the present 10,000 units a year, which when installed in farmer's fields could produce one million tons extra foodgrains every year and save 3.4 million litres of diesel annually. It could pump water upto 30,000 gallons a day in places where the maximum height from the water level was five metres, particularly useful in States like Bihar, Uttar Pradesh, Orissa and West Bengal.

[Hindustan Times, Delhi, May 4,'80]

Low Cost Biomass pump

A biomass powered pump which could prove a boon to small farmers, has been developed by the Central Power Research Institute. The pump which works on steam condensation and expansion principle, uses firewood and other easily available biomass and lifts 1200 litres of water per hour. The device could replace conventional pumpsets which consume 9000 million units a year. Institute director V. R. Narasimhan told newsmen here today that since extension of power supply to remote areas would not be possible in the near future the best solution would be generation of energy at the site of utilisation using locally available resources. " The biomass pump is a step in this direction. " he said.

[Extracted from Indian Express, Bombay Issue dated 1st May, 1980]

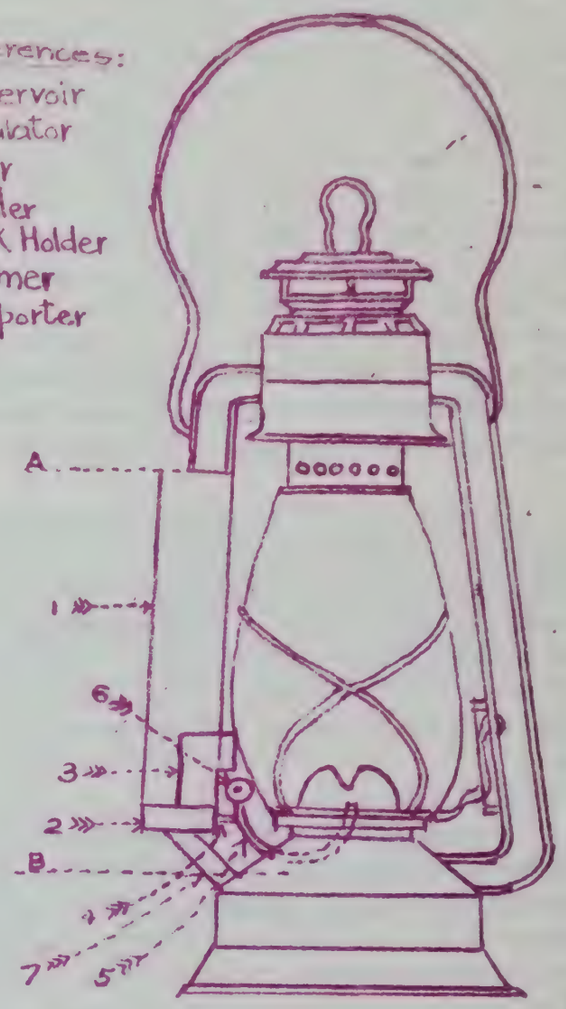
Solar grain drier :

The Central Mechanical Engineering Research Institute, Durgapur has designed, fabricated and installed a vertical bin type continuous solar grain drier. The drier has an average capacity of one tonne per day. The grain is dried by continuous flow of hot air blowing at right angles to the vertical chambers. The downward movement of the grain is controlled by manually operated valves. The air is heated by means of solar heat collectors specially designed for the purpose.

[CMERI, Durgapur]

THE MAGAN DIPA:

Kerosene oil is a mineral oil pumped out from the bowels of the earth. Man does not produce it but he merely extracts it from stock held by nature. Its economy belongs to the economy of predation, being in the hands of private enterprise today. The use of such oils, which man produces annually, places us on an economy of permanence, affording a perpetual source of employment, where the reservoir will not be exhausted. The Magan Dipa burns about 20% less oil in a given time than kerosene lamp with the same size of wook. There are non-edible oils like mohuva, neem, karanjia, rayan, agara, polang, cashewnut, etc. can be used for illumination in place of kerosene. The use of vegetable oil for purposes of illumination raises several problems in devising a contrivance to burn it. Vegetable oils, being thicker than kerosene oil, do not rise up the wick easily much above the level of the oil in the container. Hence, the flame has to be as near to the level of the oil as possible. This we have been able to do in the Magan Dipa by resorting to the principle of "Hiros fountain". Magan Dipa principle is applied to existing kerosene lamps for burning vegetable oils. This course, incidentally, will save the consumer much extra cost as he need not go in for new lamps but get his present ones converted.



To convert an old kerosene lamp to burn vegetable oil, one of the supporting sides has to be taken out, the bottom of the oil container opened out and the Magan Dipa parts (indicated between A-B in sketch I and Sketch II-1) have to be soldered on. The supporting sides in the kerosene lantern are air-feeders to the burner. Now that one of them is dispensed with, the old oil tank, which is no longer needed, is converted into an air chamber to feed the burner. The main parts of the Magan Dipa should be studied with the accompanying sketches and then the changes can be affected without much difficulty. The size and measurements in these sketches can be varied proportionately to suit different kinds of lanterns.

PARTS OF THE MAGAN DIPA :

The Reservoir : (See Sketch I-1 and Sketch II-1 & 2) - As the oil in this lamp has to be gravity-fed, the reservoir has to be above the level of the flame, is made of a tube 6" in length and 1 1/3" in diameter, the upper end of which is closed. The lower end is fixed over a rectangular opening in the top of the regulator. This tube has to be perfectly air-tight, otherwise the vertical column of oil in it cannot remain above the level of the burner but will flow out either through the filler or the burner.

The Regulator : (See Sketch I-2 and Sketch II-3) - This is to make the oil level constant. It consists of a flat tin box 1 7/8 x 1 1/4" x 3/8" to the top of which the filler and the reservoir are fixed and from the bottom of which the feeder tube supplies the wick with oil.

The Filler : (See Sketch I-3, Sketch II-1 & 2) - This serves our double purpose when the reservoir is laid horizontally, with the burner above it. The oil can be poured into this to fill the tank. When the lamp is in the upright position this becomes

KUMARAPPA'S ALTERNATIVE TO KEROSENE LAMPS

an air inlet. As the wick feeds the flame, the level of the oil in the regulator will fall slightly and an air-bubble will enter the reservoir through this filler to release a bubble of oil to restore the level in the regulator.

This is a tin tube 1 7/8" in length in the shape of an inverted L, the bent part being 7/8" in length, with a diameter of 3/4" and is fixed over a whole 5/8" in diameter in the top of the regulator with the opening pointing towards the flame.

The Feeder : (See Sketch I-4, Sketch - II-1) - This is a tube 3/8" in diameter and 3" in length which connects the bottom of the regulator with the wickholder through which the oil in the regulator is fed to the flame.

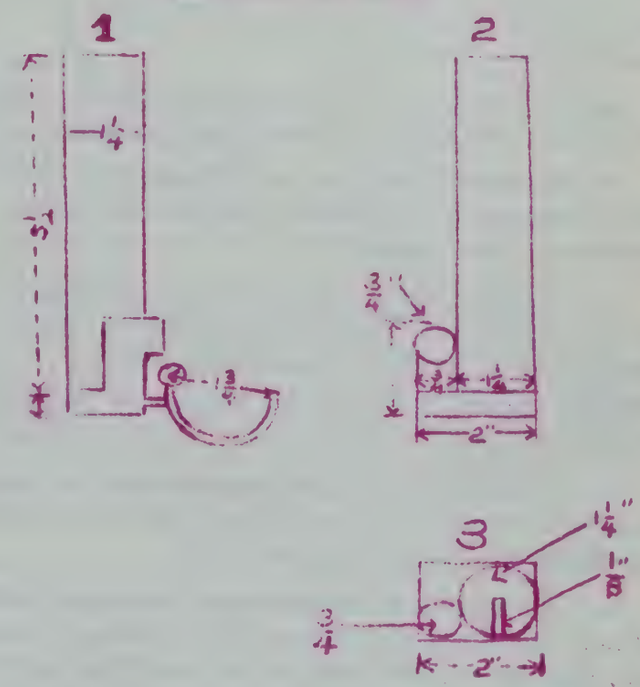
The Wick-holder : (See Sketch I-5) - In the adapted lanterns this tube (2" x 3/4") is kept in the oil tank under the burner.

The Trimmer : (See Sketch I-6, Sketch - III) - Where kerosene burners are used, the trimmer being below the level of the flame, requires special arrangement to make it oil-tight. This is shown in Sketch III. The trimmer bar (3) which carries the toothed wheels (6) is sealed at the dead end with a cap (4). On the other side it is wound around with thread (5) to form a washer which is covered by a lightly fitting tin tube (2), which is soldered to the burner. This inner tube is again coated with a thread washer in its turn and covered with the outer tube (1) which is soldered to the trimmer disc.

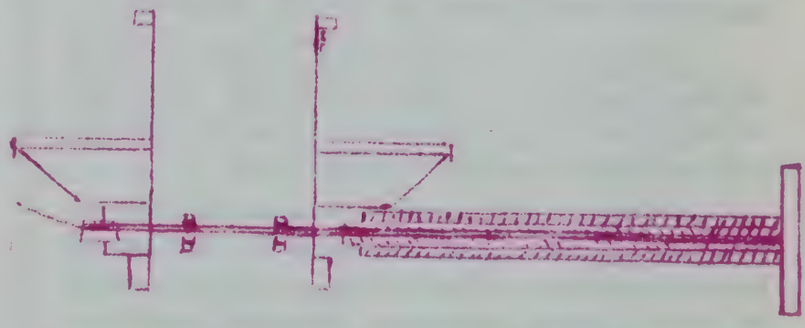
The Burner Cup :At the point where the wick ends, the wick holder is shaped like a cup. Here, an any excess oil, which trickles down, collected and acts as a small open oil container which feeds flame.

Directions for Use :Fill the reservoir as suggested in the paragraph on the filler. The oil should be clean and poured slowly so that the air in the reservoir comes out without bubbling & spilling the oil. While carrying the lantern unnecessary shaking should be avoided as any jerk changes the level of the regulator & the flame and makes for leakage. If the flame is lower than the regulator, more oil flows into the burner cup and the flame becomes small and dull.

SKETCH II



SKETCH III



Dear Readers!

This middle-spread is introduced to bring out details of techniques appropriate for villages. We invite you to suggest and send items for this.

Magan Dipa Technique given here is three decades old, but the need to conserve fossil fuels has become more realistic now. If others have experimented in vegetable oils as fuel for lamps, we will welcome such information.

Awaiting your innovative ideas and such useful informations that you may come across-

Editor

5th June - The World Environment Day

[As a Special on world Environment Day–June 5th this article is being put up. It is based on the article ' Resources in Trust ' by Sri. Gurmit Singh, President Environment at Protection Society Molaysia published in ' Development forum ' May '80.]

Some Problems Created . . .

A quick survey of the threatened natural resources in Asia reveals the following grim picture :

- Tropical forests are being logged at such a rate that most of them wiil become commercially exhausted in the 1980 s.

- Fish catches in most Asian countries are dropping and even the freshwater fish that used to flourish in rice fields are now disappearing as their breeding cycle is disrupted by the greater frequency of draining the fields for more rice planting seasons.

- The Middle East became denuded of trees many centuries ago, India and Nepal are now following with a rapid rate of deforestation.

- The quality of water supply from most Asian rivers is deteriorating as a result of increased siltation, greater human sewage discharge, as well as increasing discharge from ill-controlled industrial estates. Only about 10 percent of the rural population's water supply meets the W.H.O. standards.

- Water–logging and salinity are now problems in many agricultural areas of China, India and Pakistan due to the existence of irrigation practices without adequate underground drainage.

- Extensive cultivation of mono-crops, especially in tropical Asia, has given rise to frequent attacks by pests and the subsequent massive use of chemicals which triggers another chain of ecological upheavals.

- Air–a basic natural resource-is being polluted by the increasing discharges of carbon dioxide and other gases, arising from increased woodburning as well as the inefficient of operation public transport systems and factories.

. . . because of

- The almost insatiable demand by the First World either directly for Asia's raw materials or their derivatives.

- Asian Governments disregard about long-term consequences for the sake of immediate or short–term profits.

- The existence of powerful elites within Asian nations to whom huge benefits accrue from the rapid exploitation of natural resources.

- Military or ideological conflicts like those currently underway in South–East Asia, where the enemies' natural resources are targets for destruction.

- The philosophy behind the operations of industrialists to whom natural resources are just temporary market supplies to be maximally utilized before there is a switch to a new product.

- The massive gap between the have–nots of Asia and Asia's rich which works strongly against self–restraint measures etc. etc.

Some rectifying steps . . .

- Energy from biogas rather than from oil and coal. While solving a rubbish and sewarage problem, energy is made available for cooking.

- Integrated farming - which forms a closed loop between the growth of crops, the rearing of poultry, the breeding of freshwater fish from the fishponds.

- Much greater use of bicycles, buses and trains for inter and intra-town travel cuts down air pollution, reduces land wastage and conserves energy, especially that being derived from rapidly depleting oil stocks.

- Conserve forests, plant trees, cut down fuel and timber need by finding ecologically sound substitutes.

- Ensure that development is not achieved at the cost of the complete destruction of our natural resources.

. . . to a final solution

There is a growing conviction among thinking Asians that the only way to guarantee long term sustainable development is to ensure that natural resources are immediately recognized as national trusts - even more important than man–made monuments and temples. Recognition alone will not be enough – nations will have to draw up suitable laws to protect and manage these resource trusts.

If the governments of the developing countries are not willing to make the courageous decision of converting their natural resources into national trusts, their people face the prospect of ceasing to be even the " hewers of wood " and the " carriers of water ". For there would be no forests to be cut or clean rivers or wells from which to lift the water.

The Urban Population :

World urban population has doubled since 1950 and may well double again before the end of the century. About two thirds of the population of the developed countries lives today in urban areas and this proportion is likely to increase to three quarters by the year 2000. While only about one-third of the population lives today in urban areas in the developing countries, this proportion is likely to be nearly one-half by 2000.

[UN Weekly Newsletter, April 25, '80]

World Oilseeds Expanding :

World output of oilseed products in 1980 will set a record for the third year running, pushing supplies well beyond demand, according to the estimates of inter-governmental Group of FAO on Oilseeds, Oils and Fats, the output of edible and soap fats and oils is likely to rise by nine percent to 61 million tons and oilseed proteins by 18 percent to 46 million tons.

[UN Weekly Newsletter, May 9, 1980]

Cutting The Soil Under Our Feet :

The experts estimated that the annual silt load in the Kosi river at Chatara and the rising deposits from all its three tributaries,Arun Kosi, Tamur Kosi and Sun Kosi, was a staggering 17 crore tonnes a year. Thus experts fear that every year 240,000 cu m. of Nepalese soil is dumped into the Bay ot Bengal making Nepal poorer and poorer.

About 87 percent of Nepal's population of 14 million depend on forests for firewood, timber for house-building and fodder for cattle. In the past 15 years, forests over an area of 33 lakh hectares have virtually been wiped out. It is said, every year nearly 77,000 people migrate from hills to plains and cut down large number of forest trees for agriculture and residential purposes. The problem of falling trees and soil erosion has become so acute, it is said, that trees are hard to come by these days, that Kathmandu has run out of firewood to cremate its dead and that visiting trekkers are paying Sherpa guides 120 Dollars a ton for wood to keep warm from Namche Bazar to the Everest base camp.

It is estimated that Nepal must be losing about two million cu. in. of top soil a year. Only eight of the 55 hill districts can still grow enough food for their inhabitants and two thirds of them have officially become food deficit areas in just one and half decades time.

It will take at least two and a half decades to check the problem of soil and water conservation in Nepal, says an expert attached to the Soil and Water Conservation Department. Meanwhile the Nepalese Government has initiated both long term and short-term programmes in an effort to contain soil erosion.

[SPS]

Nature Club :

One of our close associates Sushilchandra alias Pandit Bhalerao, a young dynamic science teacher in Wardha is engaged in an all-out war to save Nature. He started his crusade with his one man army in 1976. In the last four years, his work has gathered momentum with more Nature lovers joining his Wardha Nature Club. The tiny group of W.N.C. is engaged in a variety of activities like tree plantation (about 600 plants in the last two years !), excursions for proximity with Nature, weekly trips for bird watching, star-gazing and publication of bulletins etc. He and his co-workers are trying their best to support movements like 'chipko' and 'silent valley'. We are sure that W.N.C. with Pandit as its organiser and the army of enthusiastic school children as workers would succeed in all their activities. SFV wishes them all the best !

★ INTERACTION ★

A bulletin of the kind which aims to establish a link between the isolated efforts of carrying science and technology to the villages cannot achieve much if it keeps its readers at arms length. 'Science for Villages', aims to blot out the distance between the readers and the writers. We wish that every reader should find his own contribution appearing in the forthcoming issues of this bulletin. We particularly welcome reactions from people belonging to the following category :

- A scientist working in any of the laboratories in India or abroad. He may write to us about any achievements attained by himself or his organisation in the fieid of science, technology or health that could be of special benefit to the villagers.
- A social worker dedicated to the welfare of the 'man in the hut.' Such a worker is the person who can best have a perspective of what a village community needs and what the world of knowledge could offer. His experiences and suggestions are of immense value which must not go unnoticed. This bulletin happily welcomes first hand experiences of such people. Also welcomed are the precise reports of institutions which are engaged in educational and developmental works in the countryside.

Articles relevant to the objectives of this bulletin and critical reviews of books of pertinent nature are also accepted for publication.

ABOUT OURSELVES - CSV News

[This is a new column we are starting to share our own experience the transfer of rural technology. CSV, Centre of Science for Villages strives to be a bridge between generators of technology and the users of such techniques as will assist the rural poor. We are interested in techniques which not only increase production but also decrease disparities – Editor]

The New Campus :

As the first step towards its village extension programme, CSV has decided to shift its venue to its new campus at Dattapur – a village 5 km. away. The campus, which was christened as ' Taknikpura ' or ' Techniquepura ' on the occasion of the Kumarappa Meet in February, would serve as a learning-cum-exhibition-cum-production centre for the various rural technology projects undertaken by the CSV with the help of DST (Department of Science & Technology).

Five huts have been presently completed using bamboos reinforced by mud mixed with wheat husk. The walls thus made are coated with bitumen dissolved in kerosene to render them waterproof. Inspite of the difficulties due to acute shortage of water in summer, the group engaged in the projects of construction techniques and construction materials, geared itself into action for the completion of the work before rains started. The construction work on a bio gas plant with ferro-cement gas holder, a well for water, compost tanks for slurry, is also in full progress. Modified design of Chinese type gas plant has been constructed and has started functioning. So also for the lime pozzolana cement substitute unit a lime kiln, tanks for storage of fly-ash & for slaking lime and a Ball Mill have also been put up.

Vinobaji Inaugurates Janata Bio-Gas Plant :

Acharya Vinoba Bhave inaugurated the modified Chinese design bio-gas plant at Techniquepura on 21st May, 1980. The plant was constructed by the workers of CSV under the guidance of Shri Bhausaheb Navrekar, the pioneer of ' Naygaon Latrines ' - a popular simple design of a cheap lavatory based on anaerobic fermenting in disposal of night-soil. The 100 cft. plant has a concrete dome serving as the gas holder. The pressure of gas is much more than that in KVIC plant, whereas the cost is 30% less than the latter. The large inlet windows are suitable for feeding agricultural waste as the feedstock. The water pond at the top of the plant in which the dome is submerged can be used for cultivating water-hyacinth or other aquatic plants which can be used as the bio feed. It would also eliminate the chances of leakage of gas through the dome and would help in maintaining the temperature in extreme climatic conditions. It is notable that the gas production started just on the very third day after filling the digester. (We propose giving details of the technique in SFV).

Lime Pozzolana Plant Inaugurated :

The mini lime pozzolana plant at Techniquepura was inaugurated by Dr. R. S. Sharma, Director, Kushta Dham, Dattapur on 3rd June. The experimental plant has a capacity of 10 bags (500 kg.) per day. The installation of similar plants would serve to generate employment in villages at extremely low installation cost and would help in solving the problem of acute cement crisis.

Taking Technology To The Villages – An Interaction :

Last month a team of eight young workers of CSV went on a four day tour of interior villages around Seldoh - the village where Kumarappaji had started an Ashram. It was more like a ' Get-together-get acquainted ' camp rather than a tour. The object was not to pump some information about useful techniques in the minds of villagers, but to learn from them through actual interaction. The emphasis was more on getting the first hand experience of villagers and in knowing their felt needs. The informal discussions with individuals and with groups, the demonstrations of the working of sun basket (Solar cooker) and preparation of Magan chulha (smokeless oven) went a long way in reducing the communication gap between the workers and villagers. The camp was useful in knowing many of our short comings and has initiated the process of realization of realities and self evaluation in the minds of workers. It was felt that the techniques requiring micro-capital investment such as bitumen spray, fire-proof hut, sun basket and Magan Chulha have the potentialities of being developed into trades. These are some of the techniques which can be directly useful to the rural people living below the poverty line. Yet we have to work more to be able to give them what they need. -- RAVI

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C.F.T.R.I., MYSORE

Where The Shoe Pinches

— OF THOSE WHO WEAR NO SHOES

The distance between those who constitute the masses and those who execute the programmes for their benefit is great and it is still greater between them and those who plan for them. Hence, it isnot always possible for the top to realize the real priorities of those at the bottom. There ought, therefore, be a mechanism evolved by which the voice of the dumb millions could be heard. And when these resources are as scarce as in our country their mal-utilization hurts the deprived more poignantly. This applies equally to the field of Science and Technology. Have we a method by which to identify the areas where the common man's requirement are most? Have the scientists gone out to find out where the tools of technology could help the most neglected?

To begin with, specialists taking leave of their routine research activities should give a week or two of their time in a year for this work. With their know-ledge, scientific attitude and sympathy for the misery and sorrow of fellow humans they could identify what could their own fields of science do to ameliorate the condition of the poor. A scientist should for this choose the most convenient and congenial peep-hole for himself. It could be the village with which his family is connected. It could be a rural friend who can provide him the perch. It could also be rural service institution where the workers have been able to establish a rapport with the masses there, and thus,can act as a catalyst in this interaction between the scientist and the society. So, let each and every conscientious person specialised in a particular field discover a mode by which he exposes himself to the realities of rural that is real India. These individual bridges of sympathy and understanding multiplied in thousands and having inter-communication between themselves are bound to fill up the large gap.

Once, I took a scientist of repute to a village imagine the organic unity between the various activities that go on in the court-yards of the houses in the open streets, in the artisan's homes and farms and cattle sheds. It seems that the difference between the work place and the living place has been obliterated and the economic activity and family phase have become one. I could feel its warmth. All this gives me a different meaning, to the life of less needs, even lesser fulfilled, than 'poverty'. I feel that we must so bring the newer knowledge of physical sciences to bear on the rural community that it enriches its texture without altering its basic fabric."

Another young scientist observed that people's repeated efforts generations after generations have yielded no quantum jump in their orbit of life. This has resulted in their having a fatalistic attitude. To change this situation S & T can play some part, he felt, and made score of suggestions including the following. The housewife be given a simple smokeless oven, the pulley of the village well be fitted with ball bearings, the affluents flowing in the middle of the street be soakpitted every hundred feet, community gas plants planned to provide better fertilizer and fuel, the various agricultural waste and products from forest and fallow lands utilized in industries, the housing patterns-suitably amended, new avenues of non-land based occupations introduced, decentralised products of the artisans standardised for better marketing of surplus etc. etc. Even if these were youthful optimistic ideas which may have many hurdles, still it is such as these which will pave the way.

New ideas crop up from such interactions. There should, therefore, be a movement of scientists to the villages to find out where the shoe pinches, of those who wear no shoes.

The Kumarappa Page

Village Industries

The Multi-purpose Co-operative Societies can supply raw materials, stock the finished goods and help in distributing all village industries, products especially those connected with food-processing, textiles and other primary needs. They should be ever watchful of the interest of the villagers. In particular the following recommendations may be attended to :

(1) Rich mills should be disbanded and the engines could be used for irrigation purposes as has been already suggested.

(2) Hullers used for pollshing rice should be banned.

(3) People should be informed about the better nutritive value of whole unpolished rice and about the method of cooking it, along with practical demonstrations. Polishing of rice should be prohibited or its degree of polishing should be very strictly controlled, or par-boiling of paddy should be encouraged.

(4) Where paddy husking is carried on an industrial scale, for business purposes, in the case of predominantly paddy growing areas, expensive equipments such as paddy separators, winnowers, etc. should be supplied on hire to a group of artisans through the Co-operative Society.

(5) In view of the fact that the use of unpolished rice is to be advocated and popularised, the movement of paddy from one place to another will become necessary. In order that the freight on the extra weight of paddy may not enhance the cost of rice, the freight charges on paddy should be suitably adjusted.

(6) In areas, where the implements for dehusking paddy and polishing rice are the same, and both the processes are combined into one of pounding paddy, resulting in polished rice, dehusking implements, i. e; chakkis either of wood, stone or mud, should be introduced to restrict polishing. Such implements might be supplied, as also the equipments for other industries, through the District Demonstration Centres. The polishing of rice might be discouraged by imposing a tax on implements that polish rice and the degree of polishing obtained with these should be subject to supervision and control.

Paddy and other grains and seeds required by the village should be stocked in the village itself and only the surplus could be sent out and that only through the Co operative Society.

2. Flour Grinding

(1) Good quality stones for hand chakkis and equipment for the bullock and water driven chakkis should be made available through the Demonstration Centres.

(2) The production and use of fine white flour, *maida*, should be banned.

(3) Flour mills grind large quantities of grain and hold their stocks of flour for long periods. This causes such flour to deteriorate. Therefore, such mills should be discouraged.

(4) Bullock-driven flour chakkis should be introduced where the necsssary facilities exist.

(5) Wherever water power is available from running water of a river or a canal, water driven flour chakkis can be set up.

(6) Such chakkis might be owned co-operatively by the villagers as in the Punjab.

3. Oil-Pressing

The main difficulties in resuscitating the village *Ghani* are the following :

The villages are practically denuded of the oil-seeds at the harvest time. To set this right only surplus oil-seeds should be allowed to go out of the village.

At some places the local *Ghanis* are so inefficient and small that it is well nigh impossible to make them a practical proposition. Even in a single province there are numerous types of *ghanis*. A detailed survey of the working of all such *ghanis* should be carried out. The working and advantages of improved *ghanis* should be demonstrated

There is at present a great dearth of ghani carpenters even of the old type. Oilmen find it very hard to get their timely service. Their difficulty of getting equipment and spare parts is equally great. Training should be given to oilmen and carpenters in the technique of the improved ghanis at centres which will also provide the necessary equipment and spare parts.

Tahsil Co-operative Societies of oilmen or the Multipurpose Village Societies will be the best medium for stocking oil-seeds, controlling tne prices of seeds, oil and cake, eliminating adulteration etc.

4. Gur Making

Gur making from palms is being done on a commercial scale in Bengal and Madras where the industry has been well established.

Preservation and Planing : Felling of palm trees should be prohibited. Government owned waste land, unsuited for agricultural purposes, should be utilized for raising palms so as to be sufficient to replace cane gur and sugar by palm gur in due course. Also cultivation of palms on similar private lands and field bunds should be subsidised. Adequate supply of seedlings should be arranged and proper methods of cultivation should be tauggt.

Co-operative Societies : Co-operative Societies should take up the production and market the produce. They should also supply, where needed, equipment such as pans and centrifugal machines on hire.

FROM THE LABORATORIES...

1. SUGARCANE AS RENEWABLE RESOURCE :

Sugarcane has immense potentialities to produce energy and thus mitigate the energy crisis in the world. This was stressed at the seminar on 'Sugar Cane as renewable resource' held in Pune, India in March 1980. According to S. K. Somaiya, President of the All India Alcohol - Based Industries Development Corporation, Sugarcane is the most efficient plant for conversion of solar energy. A ton of sugarcane contains, on an average, 1.15 million calories – slightly more than one - half in the fibre and less/ than one-half in the sugar content. Cane and sugar have opened new vistas for production of feed stock raw material for a large number of chemicals, proteins, foods, motor fuels, papers etc. The use of alcohol as a fuel is the topic of World-wide interest. In India, use of alcohol in a dual fuel engine or in an emulsified form is in progress at the Indian Oil Corporation Research Centre.

2. CFTRI DEVELOPS NATURAL COLOURS:

The Central Food Technological Research Institute (CFTRI), Mysore, has developed technology for making natural colours in a dispersed dry powder form from safflower petals, blue grapes, **KOKAM** (Garcinia indica) fruit and beetroot. These colours find use in a wide range of products like syrups, jams, jellies, sauces, soft drinks and dairy products.

3. FISH-MEAL FROM TRASH FISH :

Regional Research Laboratory (RRL), Bhubaneshwar has come out with a technology for the production of "Fish-meal" from trash fish and fishery wastes from fish processing industries. The Unit designed and worked at the laboratory can produce about 50 Kg. fish-meal per day from 250 Kg. low grade fish. The process of production of fish–meal consists of washnig the raw fish, cutting into pieces, cooking, pressing the cooked meal and drying under continuous mixing over a heated sand bed. The dried material is powdered using a hand operated grinder. The Item of equipment required for the Unit are simple in design and can be fabricated using locally available materials.

4. BAGASSE NEWSPRINT :

For the past 30 years and more, scientists the world over have been working to develop technology for the manufacture of newsprint grade paper from bagasse, the crushed sugar-cane after sugar has been extracted from it. The tropical world produce some 55 million tons of bagasse annually but it has found little use except to be burnt as fuel to some extent and, therefore, has to be discarded as refuse. But so far, no completely satisfactory process had emerged. Now, however, the Government Industrial Research Institute in Shikoku of Japan's Ministry of International Trade and Industry and Hitachi Ship building and Engineering have announced joint success in developing a process to produce newsprint-grade pulp from bagasse. Following its success in producing newsprint-grade pulp from bagasse, Hitachi Ship building hopes to develop technologies to utilise other berbaceous fibre sources such as reeds, wheat and rice straws for pulp and paper production.

5. BIO-AGRO-ENGINE :

An agro-engine that can run on biogas has been designed by the Farm Machinery Department of Tamil Nadu Agricultural University. The 2.5 hp engine is started using petrol and immediately after starting the petrol supply is cut off and the engine continues to run on biogas. The power from the engine could be used directly for various agricultural operations like irrigation, threshing and winnowing and it is ideally suited for small farmers with five cattle to feed the gas plant. The farmers' dependency on external energy sources as electricity and diesel would be reduced considerably.

Kumarappa Literature For Sale

A few copies of the following Kumarappa Literature are available :

Practice & Precepts of Jesus	. . .	Rs. 1.50
Public Finance & Our Poverty	. . .	Rs. 1.50
Why the Village Movement (E & H)	. . .	Rs. 3.00
Cow in our Economy	. . .	Rs. 0.75
Kumarappa - a biography	. . .	Rs. 0.25
Gram Udyog Patrika (1939-1946)	. . .	Rs. 20.00

(Postage & packing extra)

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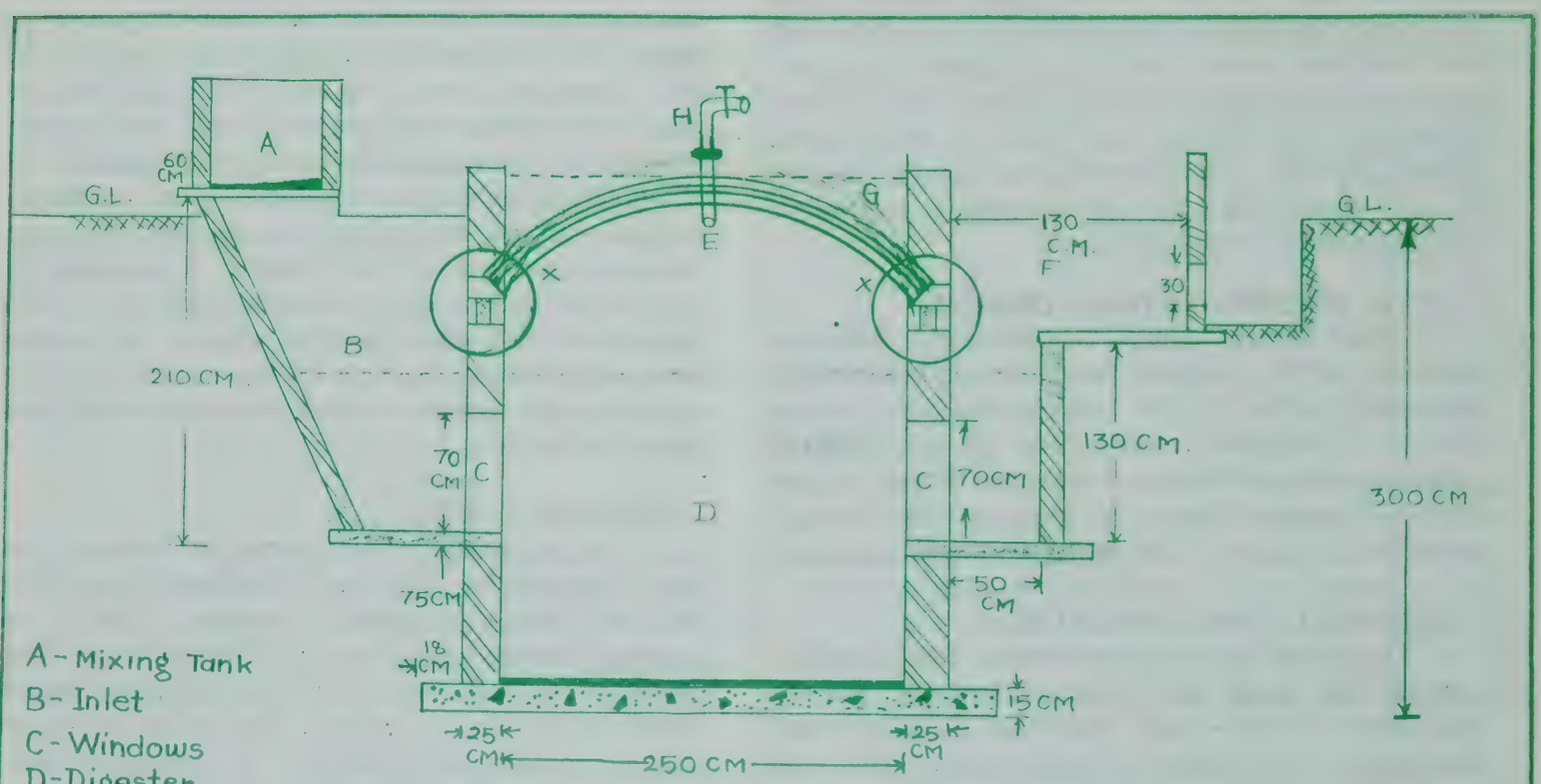
MASONARY DOME BIOGAS PLANT:

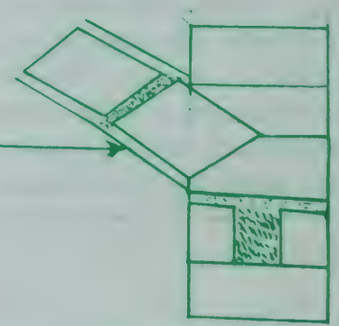
Background : Fifty years ago, T.C Kumarappa advocated the use of renewable resources of energy for an economy of permanence. The energy crisis of late seventies proved that he envisaged a prophetic vision. Then begun a hectic search for alternate resources of fuel to over-come the crisis. In the dawn of eighties, the combination of biogas with solar energy has emerged as a viable alternative to the depletable resources of energy at least in the third world.

In India inspite of the high potentiality for the popularization of biogas plants not much could be achieved. Only 40,000 plants (mostly KVIC type) have been erected in the last 20 years. The chief hindrances in the diffusion of biogas technology include :- (a) high installation cost (b) Low life due to wear and tear (c) a sharp fall

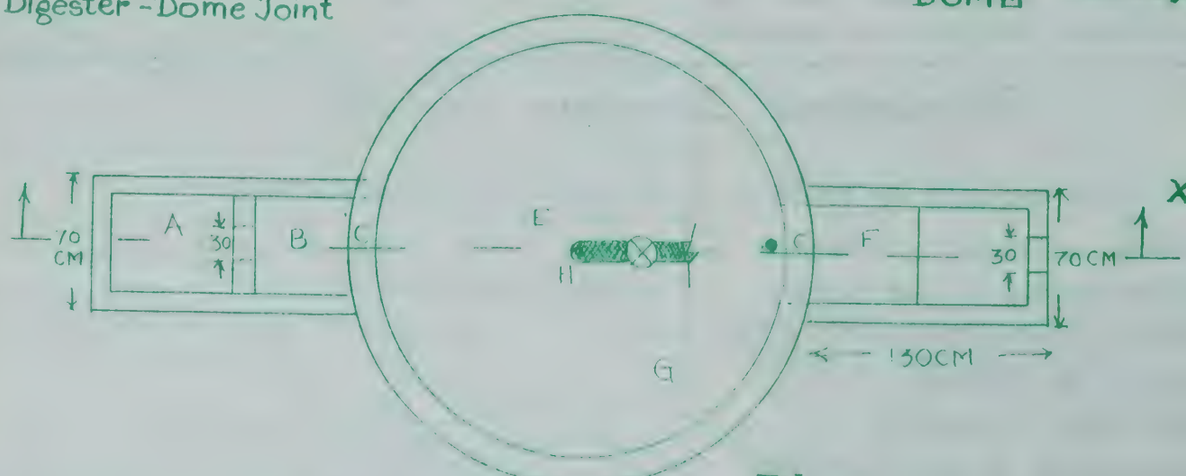


A - Mixing Tank
B - Inlet
C - Windows
D - Digester
E - Gas Dome
F - Outlet
G - Water Reservoir
H - Gas Exit
X - Digester - Dome Joint

Elevation



X (BRICK WORK)



Plan

a new adaptation

(c) gas production at low temperatures (d) dependence on experts & outside agencies (e) non-availability of raw materials and (f) lack of training centres etc. A number of attempts have been made to evolve a design which would be free from these defects. It seems that with proper modifications the original Chinese design which eliminates the movable gas-holder by a fixed masonary dome can prove to be the right choice for India. However, most of the Chinese design plants in India (also known as fixed dome, masonary dome or Janata bio-gas plants) are reported to be non-functioning. The chief cause reported in most cases being the leakage of gas mostly from the top surface.

With this background, the success of the biogas plant installed at Techniquepura campus of C S V is heartening. A 3 Cu.M. plant was constructed under the guidance of Shri Bhausaheb Navrekar. Three more plants of the same design are constructed at a nearby village Surgaon. More than 20 of his plants are already installed and working in and around Nasik City. All these plants are giving excellent results. Some of them are functioning for more than a year.

The plant of the design given herein yielded gas on the third day itself. The cowdung collected during May for initial loading was stored for two weeks by sprinkling water and covering it with wet gunny bags. The whole mass of cowdung (i.e. about 175 cft or 4375 kg.) along with 25 Kg. Urea was fed to the plant at one time. The digestion was initiated by an inoculation of slurry from an older gas plant.

Construction : The plant consists of an underground digester made up of bricks covered by a fixed masonary dome, the top of which is shaped into a shallow water reservoir.

Mixing chamber(A) is constructed by placing a stone slab on it and erecting a reservoir of brick-work on a projection of angle-iron. Its outlet is covered by an adjustable wooden flap. The depth of digester (D) is 9' 6" (380 Cm.) below ground-level (G.L.). The windows (C) for entry and exit of slurry are wide enough (2'-3"x 2'-3") for entry of a person for cleaning purposes. An arch is given above each of them.

The construction of the brick dome is similar to that of the temple domes. On the centering, a loose clay dome is constructed. A 2" concrete layer is spread over it. The dome consisting of a single layer of brick reinforced by a thick cement mortar is constructed above it. After a lapse of one week the sealing of the micro-leaks within the digester and dome is done by soaking an old jute bag in dilute cement slurry and hitting it on the joints of bricks after scalping the dried mortar from the same. This facilitates the entry of cement within the interspaces of bricks.

Advantages :(1) Low cost - About thirty percent reduction in the construction costs in comparison with the KVIC model. (2) Better use of agricultural waste because the use of wide windows as against narrow feeding pipes for entry of feed-stock facilitates the feeding of small pieces of agricultural wastes. (3) High pressure - the gas from the plant at Techniquepura is being supplied to a kitchen stove at a distance of more than 400 ft through a rubber tube of less than half-inch diameter. (4) Use of local materials- Except cement, all other materials are locally available. (Now we propose using our own lime pozzolana cement). (5) Use of local skill- Any skilled and trained mason can build this plant and hence the degree of dependence on an outside agency & experts is minimised. (6) Longer life- Due to absence of any moving, fragile or corrodable parts, the plant becomes long-lasting. (7) Low maintenance cost- The labour of yearly removal and painting of gasholder is saved. (8) The microbial activity is optimum at lower depths. (9) The fixed dome serves the following purposes : (a) Helps prevention of leakage as water fills up micro-spaces & prevents direct atmospheric contact. (b) Adds aesthetic value by growing lotuses or other aquatic plants. (c) Can be used also for production of feedstock through raising plants yielding high amount of gas like water-hyacinth etc. (d) Helps thermal insulation & consequently gas production in the digester is kept constant even in winter.

ECO-AGRICULTURE - AJOY KUMAR

Our agricultural production has withnessed a marked improvement in quantity by making the maximum use of chemical fertilizers and pesticides. Researches are being constantly carried out to study the uses of all possible chemicals as plant food, insect killer, fungicides and soil amendments and new manufacturing plants are being set up all around to meet the increasing demand. But the question is if this excessive use of chemicals will be helpful to us in the long run ?

Mr. William Tucker in his article ' Organic Farming in America on ' How To Avoid the Dust Bowl ' in SPAN of November, 1979 quotes many U. S. Farmers about the dangerous effects of chemical fertilizers and pesticides on their land. One farmer of Nebarske Roman Wortman says that one day in the spring of 1972, when he rode out in his tracter to spray his field with pesticide he found that he was leaving a trail of dead birds behind him. " There were half a dozen of them at the edge of the field ", he told " I rode back into the yard and there were more dead birds along the drive-way where I had sprayed only a half hour before . From that day to this, I' ve never used another pesticide, herbicide or fertilizer on this farm ". His fields of corn and alfalfa, were shimmering with a bright green. " Look what I have to show for it ", he said.

In India also, such problems are being experienced by our many advanced farmers. It is a matter of research for agricultural scientists to study the long term effect of the chemical fertilizers which are compounds containing plant food and other chemical substances. They can be chemically compared with salts in their composition and reactions. When these fertilizers are added to the soil, only a part of it is absorbed by the plants and the unabsorbed portion keeps on accumulating in the soil. Therefore, at the cost of increasing the production for a few years, we may be allowing a major part of poisonous chemicals after accumulating in the soil kill the micro-organisms which are supposed to be the best workers of the natural bio-laboratory of the soil. These micro organisms which have been helping mankind to keep the soil in healthy condition, which have been enriching the soil with nutrients in a natural way since the beginning of agricultural history are being unknowingly harmed, progressively. Other serious casualities are the earthworm and the fish in the rice fields, the snails, oysters and various other similar types of aquatic creatures.

The effects of pesticides are more serious. Year after year stronger pesticides have to be formulated and used in increasing doses because the pests have shown a capacity to develop immunity to pesticides after a certain period of use. When the pesticides are sprayed in fields, only a small part of it is absorbed by plant foliage, while the major part falls on ground and is absorbed in the soil. A substantial part goes into the air. Like fertilizers, pesticidal chemicals also destroy soil and micro-organisms, but more potently. By the use of pesticides many useful insects called predators which help in controlling the harmful insects in a natural way are also killed; thus, the natural balance between harmful and useful insects is seriously disturbed which results in more severe incidence of harmful pests. A large variety of birds are also nature 's pesticides. They feed upon harmful, insects, thereby keeping them under control. By feeding upon the insects poisoned by insecticides, the birds die.

There is a need, therefore, for every agricultural university to set up a separate unit to study these problems and provide proper guidance. The experts in fertilizer and pesticide factories are primarily chemists and not agriculturists. It is the concern of agricultural scientists to determine the needs of crop and soil.

More intensive researches in organic farming and biodynamic methods in agriculture may open many new ways to overcome these problems and make our agricultural development more stable, maintaining the natural environmental balance. The field of bio-fertilizers is a vast one. It does not merely include the traditional cowdung and dry leaves which make the compost manure. Researches are going cn to produce various varieties of green manure, bacterial cultures and other nitrogen fixing biological systems. The production of algal fertilizer and its utilization in the rice fields on experimental basis is very encouraging.

GANDHI VIGYAN

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1. IDA Assists Forestry Project In Nepal :

The International Development Association (IDA), an affiliate of the World Bank has approved of a credit of 17 million dollar to help finance a community forestry development and training project in Nepal.

The 24.8 million dollar project is the first phase of a twenty year national forestry program designed to develop community forestry in the Hills and to establish training facilities to meet the needs for qualified forestry and soil and water conservation personnel. The project would help increase supplies of fuel-wood and fodder in Hill areas through establishment of new plantations and rehabilitation of degraded forests.

2. Compost Plant at Kothrud Launched :

A 150 ton compost plant costing Rs. 65 lakhs was inaugurated at Kothrud, Maharashtra on 9th June 1980. The Pune Municipal Corporation and the Maharashtra Agro-Industries Development Corporation have formed Maharashtra Organic Manures Co. to look after the work of the plant while Tractel Tirfor India of new Delhi has been given a contract of erecting it. The compost plant is expected to be completed in September 1981. It will consume 250 tonnes of garbage daily and produce 150 tonnes of organic manure. The total area of the plant is 22 acres, of which erection would be done on 5 acres, while 3 acres of land would be consumed by the windrow yard.

3. India, US To Collaborate In Three Solar Projects :

A two day meeting of the Indo-US Sub-Commission on Science & Technology which concluded on 29th February 1980 has decided to take up three projects on solar energy for immediate implimentation. These projects relate to a decentralized energy system for application in rural areas, the development of solar devices for denying agricultural output research on tracking and non-tracking solar collectors for various uses.

4. UNIDO Decries Import of Technology :

The United Nations, Industrial Development Organization (UNIDO) has warned developing countries against the adverse effects of importing technology from trans-nationals as a major source of technology has given rise to several problems. Confusion over basic values and social priorities has often led to the uncritical purchase of technologies and techniques. This has in many cases proved detrimental not only by increasing the 'gap' between the rich and the poor, but also in earnings and social status between men and women.

5. Oceans of Energy :

Ocean thermal energy conversion (OTEC) is a process that uses temperature differences between warm surface waters and colder ocean depths to produce electricity. Although the OTEC concept is nearly 100 years old, the previous low cost of fossil fuel and the abundance of hydro-electric power proved a deterrent to its development. But the basic technology needed to generate electrical energy from the ocean has now been proven.

Soaking up the sun in tropic seas :

The OTEC plant is a very large heat engine in a first heat exchanger the warm surface water of the ocean vaporizes a working fluid such as ammonia that has a low boiling point. Like steam in a conventional power plant this gaseous pressurized fluid drives a turbine that is connected to the generator which produces the electricity. The low-pressure fluid ammonia from the turbine is then condensed to its liquid form in a second beat exchanger by the cold ocean water pumped from hundreds of metres below the surface. In this closed cycle, the ammonia fluid is used over and over.

The OTEC Potential ;

There is enormous potential in OTEC. Six sevenths of the total sun energy received by the earth is absorbed in the upper layer of the ocean. This energy is converted to heat (warm surface water) and then part of it is reradiated to space. OTEC is the only solar energy technology that does not involve energy storage. It can operate 24 hours a day whereas other solar energy technologies are limited by day-light hours, or energy storage.

Potentially, OTEC can produce 40 times the electric power used in the US last year. The ocean thermal gradient is a global resource; world-wide there are 40 sites. The best sites are in tropical oceans within 10^0 latitude of the equator. The large-scale distribution of the OTEC thermal resource for the globe from 40^0s to 40^0N latitude in terms of the temperature difference between the surface and 500 metres, and the surface and 1000 metres, has been determined.

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ABOUT OURSELVES - CSV News

Introducing ourselves : It all started when a tiny group of young scientists and technologists from Delhi, dissatisfied with the present state of scientific and technological research in the country, initiated serious discussions on the propriety of scientific research and its utility in solving the problems of rural India. The concept of CSV emerged after years of collective brooding. From February 24, 1979, the Centre has undertaken rural technology projects financed by DST. The team presently engaged in the CSV activities at Wardha comprises 11 scientists and about 50 trainees. The multi-disciplinary core of scientists consists of three experienced principal investigators and 8 young investigators for their assistance. The senior and junior trainees are mostly educated youth from nearby villages, some of whom are well versed with traditional artisanal skills. At present, work on the following projects is in progress :-

1. Construction materials.
2. Construction techniques
3. Heavy pottery
4. Banana-Fibre paper technology
5. Energy-Bio-gas.

Welcome to CSV : A young and dynamic researcher, Tarak Kate is a new addition to our team. He has recently submitted his Ph. D. thesis in Botany to Nagpur University and joined the Centre as a plant scientist. He believes that every scientist has a social responsibility to share with in contributing some innovations of utility value to the masses. He proposes to engage himself in algoculture research which has the prospects of offering protein-rich substitutes in wake of the prevailing situation of malnutrition in the third world. He would pursue the work done by Mr. Ripley Fox of France on a promising protein-rich alga-patensis Spirulina and would receive guidance from him.

BFPT on the March : The Banana-Fibre Paper Technology Section of CSV has undertaken a two-fold programme consisting of experimentation as well as production. Different varieties of paper are being produced from various combinations of jute and banana pulp. Resulting product is undergoing physical testing in the CSV laboratory and it would be used for file boards, files or as thinner paper.

A production target of 400 file covers per day has been set up for the section. The team has geared up from May '80 to reach the target.

Regional Research Laboratory, Jammu has prepared hard board from the sample of cotton stalk sent by CSV using hydraulic press without any chemical treatment. This seems to be having good prospects in this area. Work on similar lines would soon be undertaken by the BFPT Section to make hard board from banana stem fibre and other local agriculture waste having fibres.

Community Nightsoil Plant : A community night soil plant (KVIC model) has been installed in a nearby village-Seldoh. No cowduing is being added in the process. It has been functioning successfully for the last three months. About 70-80 persons, mostly women from the village, who had othervise to sit in the open, use the lavatories connected to a gas plant every day. The gas was initially used for lighting a mantle. However, lately as the electrification facilities are made available an alternate use of the gas is being planned. The slurry is completely free from odour and is non-obnoxious providing excellent manure.

Bio-Dung for Bio-Gas : The problem of providing bio-gas for those who have no cattle seems to be nearing solution. The Energy-Biogas section of CSV, has adapted the process evolved at TERI, Bombay under Dr. C. R. Das. Bio-dung from vegetative matter using solar energy has been successfully prepared, Green matter is cut into fine pieces, placed in polythene bags and sealed. Specific moisture content is maintained. The mass becomes soft and dunglike in twenty days. Various combinations of grass-cuttings, leaves of various trees etc. have been successfully tried. This bio-mass yields bio-gas. The properties of bio-dung are being studied further. -RAVI

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SPIRITUALITY & SCIENCE

(A Tribute to Acharya Vinoba Bhave)

Inheriting the scientific outlook towards life from his father- a colour chemist in textile industry in Baroda and a deep attachment to spiritual values from his highly devout mother, Vinoba shared his optimistic vision of a world where religions with their identities of outward forms, rituals, dogmas and set ideas will gradually vanish and the essentials of spirituality which are common to all of them will develop into a wholesome unifying force. Along with this replacement of religion by spirituality he foresaw that political thinking which is invariably subjective due to pressures of majority numbers and search for short range results by the politicians at the cost of the total and perennial interests of mankind, politics will get redundant with human evolution and will be progressively replaced by long-range objective scientific thinking. He used to say, "Religion will go and spirituality will remain, politics will go and science will remain".

He worked for the concept of one World and gave the slogan (Really a Mantra) 'Jai Jagat' meaning victory to the world instead of the common slogan 'Jai Hind', (Victory to India). To achieve this he took up from the concepts of his Master Mahatma Gandhi, who had declared that he wanted his country to be free so that it can have the liberty to sacrifice itself for the sake of the world community. He said that the individual should live for the community, the village for the district, the district for the country and the country for the world. 'Jai Jagat' got its implementation in India by the propagation of this spirit of sacrifice throughout the length and breadth of the country which Vinoba walked on foot from village to village, city to city far about two decades. He spread the message of 'Truth Love and Compassion' by asking the haves to open up their hearts for the needs of the 'have nots' and preached that there is none who cannot find one more deprived than himself for whom he cannot show compassion The 'Land Gift' (Bhoodan) Movement brought response from millions of common people and they parted with portion of their landed property for being given to the landless He further preached the concept of community sharing Gram Dan) which had four principles for bringing amity and equality. These need to be translated even on the global scale. These four points are- (i) The constituent members of the community must recognise that the gifts of Nature (to the making of which man has not contributed) like land, forests and minerals, sea wealth etc., should be regarded as the Trust for all mankind for all time to come and should cease to be in the realm of private property either by individuals for nation states, (ii) As a step to recognise this fact and take the first step towards it, a portion of the present ownership be relinquished by the individual in favour of the community–say 5% to begin with. And this quantum be gradually increased. He wanted the means of production in the community to be collective but the management and responsibility, initiative and enterprize left to the individual under a common code. (iii) The collective decision making process be done by a mode of common consensus and not by majority vs. minority and as no cleavage in the community (be it a village or a nation) could be tolerated in an Atomic Age. (iv) There should be sharing of the individuals production for the benefit of the weak and deprived. The individual and nations could

(Cont. on Page 16)

FROM OUR LABS.

NRDC Focus on Technology for Rural Areas: *The National Research and Development Corporation of India (NRDC), New Delhi,* has in collaboration with the Department of Science and Technology launched a new scheme of development and promotion of appropriate technologies in rural areas for familiarisation and popularisation of rural needs based on available technologies with NRDC.

Under the schemes, NRDC would set up demonstration units and provide the basic technologies needed by the people, for things like health, housing, less expensive sources of energy, safe drinking water, generation of employment for women and reducing their drudgery. The demonstration units would be set up on permanent basis and initially two pilot projects would be set up by first week of September one at Padruna in Uttar Pradesh and the other at Imphal in Manipur at a cost of Rs. 2 lakhs each.

Paper Houses for the Poor: If you think that waste paper can be used for only making envelops and toy boats, you are wrong. Scientists at the *Regional Research Laboratory* (RRL), *Jorhat,* are talking about a technology for building paper houses for the low income group. Paper houses based on the RRL technology are already dotting the countryside here. These have roofs of corrugated boards and made from paper waste and other cellulosic materials. These houses are light, touch, durable and water and fire resistant (Indian Express - 1-10-82)

Double Chambered Domestic Chullah: *Central Fuel Research Institute, Dhanbad* has developed a semi-portable double chambered, domestic chullah (stove) with a chimney. The chullah utilised one chamber for devolatilization of coal and the other for burning the resultant coke. Tests conducted have shown a thermal efficiency of 25%.

Low-Cost Technology to Purify Biogas: College of Agricultural Engineering, Tamil Nadu Agricultural University, Coimbatore has developed a Low-Cost Technology for the removal of carbondioxide from biogas to enrich its methane content.

The Unit is made using an empty kerosene drum. A water spray boon arrangement is provided from the top of the drum. Biogas is passed through a side inlet and is washed by the forced water spray. In trial runs with a motor pump and tap water pipe connection, the CO_2 content in biogas was reduced to eight per cent from the initial 40 per cent. The entire system without motor can be constructed for Rs. 150.

Energy From Rice Husk: A waste fired drier with a potential for using rice husk as a source of energy for drying paddy has been developed by scientists at the Tamil Nadu Agricultural University, Coimbatore. According to Mr. Arjuna Muthaiah, an agricultural scientist, paddy being the main crop in monsoon areas, any gadget that can supplement the heat energy for dehydration of paddy will be a boon to the farmer. The mobile unit consisting of an insulated chamber with grate hopper and chimney works on the principle of conduction of heat through bundles of tubes. Sixteen cast iron pipes of 6·5 cm diameter enable the heat exchanger to supplement adequate heat energy to air which passes through pipes. During experiments 200 kg. of paddy was spread over the drying bin at a time while 5 kg. 10 kg and 15 kg per hour of rice husk is fed for a duration of 120 minutes. The inlet and outlet temperatures and reduction in moisture content were observed at intervals of 20 minutes.

After trials it was found that the medium feed rate of 10 kg per hour seemed to improve the thermal efficiency besides economising fuel. The feed rate of 10 kg per hour results in 17 per cent efficiency which is the maximum feasible efficiency achieved during open working system. The absence of carbon soot and carbon monoxide renders paddy husk acceptable as a fuel.

Winter Heating & Summer Cooling Systems: An integrated system for winter heating and summer cooling for rooms by using rock bed for energy shortage has been designed by scientists at the *Central Building Research Institute (CBRI), Roorkee.* The system, consisting of solar air heaters, rock bed energy storage and blower for circulation of air has been studied for heating a room in winter and cooling of room at night in summer.

The heating system consisting of solar air heaters, rock bed energy storage, and a blower for circulation of air, has been studied for heating a room in winter. A double-walled masonry container fitted with steel grills for supporting pebbies is suitably filled with pebbles of appropriate size to store solar energy for winter heating and the coolness of air at night for summer cooling.

Nine solar collectors each of one square cu m. areas fabricated from corrugated and plane galvanised iron sheets have been provided for heating a room of size 3.5 × 3·0 × 3·0 m The performance of the system in winter was found to be satisfactory with the room temperature ranging between 18 and 21 degree celsius. This system has been commissioned for room cooling during the current summer for which solar collectors have been disconnected and the coolness of night air is stored in the pebblese for cooling during day time. In these preliminary exporatures ranged between 27 and 30 degree celsius temperatures within summer comfort range.

UNDERSTANDING RURAL INDIA

Prof. M. L. Dantwala

Rural India

524 million Indian citizens live in some 575,936 villages. Nearly 80 per cent (78.8) live in villages with a population of less than 1,000 persons or roughly 200 households each. Out of these 5.76 lakh villages, 1.50 lakhs have a population of less than 200 each and another 1.69 lakhs have a population ranging between 200 and 500.

Poverty

The per capita domestic production in rural areas is 20 percent lower than that in urban areas. 51 per cent of rural population is living below the poverty line. According to the calculations presented in the Sixth Plan (1980–85) document (3), in 1979–80, the bottom ten per cent of consumers in rural India had an average monthly per capita consumption of Rs. 32 at 1979–80 prices the bottom ten percent of consumers in rural India had an average monthly per capita consumption of Rs. 32 (at 1979–80 prices). In urban areas, the bottom ten per cent had monthly per capita consumption of Rs. 41.

Disparity

Rural Assets and their Distribution : The average value of total assets per household in 1971 was Rs. 11,310 ; the average liability was Rs. 479. But this average, like many others, is highly misleading. Out of 77 million households, as many as 27 million (or 35 per cent) has assets valued at less than Rs. 2,500. As expected, as many as 22·5 million households in this group had no land or had less than half acre. At the other end 8 million households (10·1%) in the three top asset groups possessed assets worth more than Rs. 30,000. Out of 295,000 households, which owned land measuring 50 acres and above, 214,000 belonged to the three top asset groups. Dwellings account for 20 per cent of the value of total assets of rural households. Livestock constitutes 6·5 per cent and durable household goods 4·6 per cent of the assets. The average value of durable household goods was Rs. 61, Rs. 125 and Rs. 199 respectively, in three lowest asset groups. Implements and machinery constitute a meagre 2·7 per cent of the total value of assets.

Source of Livelihood

The total labour force (for the age group of 5 years and above) in March, 1980 is estimated at 268 million. Out of these, 216 million persons (149 million males and 67 million females) were working or sought work in rural areas. The composition of 146 million non–working rural females was radically different. About 19·4 million were attending educational institutions. The largest component of 48·6 million was engaged in domestic duties only and 36 million combined domestic duties along with sundrywork such as free collection of firewood, cattle feed, sewing, tailoring, weaving, etc. for household use. The remaining 42 million were either young, very old or disabled.

Employment Profile

On the basis of the 32nd Round of the NSS (1977–78), the sixth Five Year Plan has estimated that 51·6 per cent of male workers were self-employed in agriculture and another 11·4 per cent were self-employed in non-agriculture pursuits. The percentage of "regular salary /wage employees" in agriculture was 4·3 and 6·8 in non-agriculture. Next to the self-employed, numerically the second largest category of male workers was that of casual labourers, accounting for 22·6 per cent of the total–20·5 in agriculture and 5·1 in non-agriculture. The distribution of rural female workers was somewhat different. 60·4 per cent were salf-employed and 35·6 per cent worked as casual labour, mainly in agriculture. The rest were distributed in other activities.

The incidence of unemployment is more severe in urban areas compared with rural areas, but as the number of persons in the labour force is larger in rural areas, the number of persons affected by varying periods of unemployment is also larger in rural areas. It will be noted that in rural areas, the incidence of unemployment is greater among females than among males, though the participation rate of females is smaller than that of the males. In 1977–78 (32nd Round NSS), it was found that the rate of unemployment of agricultural labour households was as high as 15·8 per cent as against only 2·7 per cent for the self-employed households with agricultural occupations (who are mainly cultivators of land). The agricultural labour households' percentage share of unemployment in the total (rural + urban) unemployment was as high as 46·7 per cent, though they constituted only 21·2 per cent of the total population.

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Agrindus Experiment : (A community approach to Development and Justice).

Agrindus means an Agro-Industrial community development centre working for the promotion of health, education, culture and social project works under Banwasi Seva Ashram, has a team of over 200 whole time workers and about 400 part time village workers, operating in the tribal area of Mirzapur district at the south east fag end of the State to Uttar Pradesh. Its project area consists of four community development blocks, 400 villages and 3,00,000 population. 75 percent of this population consists of scheduled and backward castes and the tribes. The per capita income of these people ranges between Rs 150 to 200 per annum 75 percent of these families never have a full meal. They have to eat forest leaves (Chakwad), jungle roots (Gethi) and flowers (Mahua) for three to four months a year for survival. When Agrindus started operating in this area in 1967, 90 percent of the rural families were living below the poverty line, and 50 percent of them were living at the semi-starvation or destitution level. A demonstration farm was simultaneously established at the Banwasi Seva Ashram on 250 acres of land, with terraced out fields looking over one another with grain laden crops, 8 irrigation reservoirs and a system of gravity canals, pipe lines and pumpsets which make this farm drought proof. It has extensive plots of a variety of grain crops, fodder, oil seeds, pulses and fruit orchards.

The problem was how to transfer the proven technologies and successful results to the rural households.

A 'Gram Swarajya Sabha' (village level committee) has been gradually constituted in each project village by taking one adult from each family as its member, working on the basis of concensus for planning and village development. For inter-village functioning a regional committee is formed at the level of a pocket of 20 to 30 villages by taking the President and Secretary of each Gram Swarajya Sabha, as its members, and at the project level, a Central Committee has representatives of the regional committee and social workers working in the field.

Farmers and artisans are brought for field visits to the Agrindus demonstration farm, dairy and khadi and village industries centre. Short duration training camps are organised for them at Agrindus and enthusiastic persons are helped to make experiments to improve their farms and allied occupations. Village Committee presidents and secretaries are invited for orientation training courses. Selected young boys are invited for longer duration training to learn improved methods of cultivation, animal husbandry or village industries, accountancy, rural engineering like construction of earthen dams, reclamation and levelling of land, operation and maintenance of irrigation pumpsets, other farm implements and machines etc. etc Tanners, cobblers, weavers, carpenters, masons, tailors etc., were also trained to improve their skills and productivity and helped to start their own village enterprises. Similarly, village doctors, literacy teachers and catalyst or social change agents were trained to promote health, resolve social disputes, eliminate social vices like alchoholism, casteism, child marriage, corruption etc. etc. Over 1500 village level technicians, artisans, health and literacy workers have been gradually trained and placed in the villages to undertake different development functions and carry them forward on a continuing basis.

In 100 to 300 literacy centres organised per year, over 40 thousand adults have been educated. One Central and 50 to 100 mobile rural libraries were organised per year to reach out utilitarian literature to the educated and neo-literate adults; 100 coaching centres organised for school drop out children, helping 2,000 children; 7 basic schools providing free education to about 1200 poor children. There is one central clinic and 9 village health posts for promotion of community health, prevention of diseases and treatment of ailments having about 150 community health friends, 15 village doctors and paramedicals in about 250 villages. Most of the disputes and village conflicts are resolved in the Gram Sabha. Some cases come to open courts or arbitration to help the Sabhas for the resolution of difficult cases. Few cases, where a moneylender, police, forest or revenue departments are involved, go to the court. In cases where a poor man is being victimised, the cases are unitedly fought. Cases of eviction, Usurious money-lending, harrassment by jungle lords are dealt with unitedly. 500 to 700 cases are thus resolved per year amicably. About 6,000 acres of ravineous scrub forest land has been bunded, levelled and turned into paddy fields. A campaign was launched to construct earthen irrigation reservoirs (900), wells with Rahats (150), lift irrigation schemes (125) bringing under irrigation more than 6,000 acres of land belonging to about 2,500 farmers. Many farmers have increased their production by 2 to 10 folds. A cross bred cow giving 10 to 15 liters of milk has been introduced. A nucleus herd of 25 cross bred cows and 2 bulls are maintained at the Agrin-

(Contd. on page 16)

SCIENCE & TECHNOLOGY FOR WOMEN

A DAY IN THE LIFE OF A RURAL WOMAN

Suman Bhatnagar

Asstt. Professor, College of Home Science, Univercity of Udaipur.

The daily work schedule of a rural woman is very busy. The day for her starts in the early hours of the morning, even before the sunrise and she is the last to retire to bed at night. She not only takes care of household chores, but at the same time looks after the farm work too. The involvement of rural women in agricultural persuits was appreciated by Randhawa in his study (1975) who aptly remarked that Haryana women are the treasures to their husbands and they do every kind of field labour except driving plough or cart. This was supported by Chakravorty (1975) who added that their arduous contribution in farm operations ranged between 50 to 60 percent. In another study by Sharma and Singh, it was found that the involvement of women in agriculture ranged between 24 to 76 percent. A study on rural women conducted by Singh (1972) revealed that the working hours of rural women ranged between 15 to 16½ hours a day. Devdas (1972) also reported that rural women in Coimbatore district worked during peak season for 8 to 9 hours in agriculture and 4 hours in household chores as against 5 hours for each activity during ordinary days. They sometimes performed agricultural operations themselves or influenced the decisions taken in agriculture. Generally women perform activities like sowing, manuring, wedding, intercultural operations, harvesting and storage. Thus their work load and duration of work at farm is heavier and longer than their counterparts elsewhere. This holds true with the farm women of Rajasthan State also.

A number of developmental programmes are being run in the country but it has been observed that the involvement of rural women in all the developmental programmes, specially concerning agricultural development, is not very encouraging. The potential of women work force as skilled persons has not been recognised so far and their significant contribution to the nation's largest economic sector, i.e. agriculture also goes unrecognised. It is unfortunate that women work more than men both at home as well as at farm but their training and education is utterly neglected.

Non-availability of time is an important reason for non-participation of women in various programmes. The present study will help in exploring the pattern of time spent by rural home-makers in agriculture and various activities such as household and child care, which will serve as a feed-back for strengthening the existing development programmes and planning more meaningful programmes for rural women.

Objectives of the study :

The present study was undertaken with the following specific objectives.

1. To find out the daily work schedule of rural women.
2. To suggest ways to make daily chores easy.
3. To suggest extension programmes for the rural women

The study was conducted in village Dhinkli, Panchayat Samiti, Badgaon of Udaipur district in Rajasthan State. It is situated at a distance of 10 miles from Udaipur city. This village was selected for the study because a number of extension programmes have been undertaken in this village by Home Science College and hence a good rapport exists. Fifty farm women were selected randomly for the present study.

The data were collected by interview technique. Observation was also made wherever required to verify the information. Interview schedule developed for the present study consisted of the following sub-areas :

(a) General information about the family, and

(b) activities in three areas-agriculture, care of cattle and household.

Findings :

The findings of the present study are presented in three parts-general background, time spent in home and farm and suggestions for improvement.

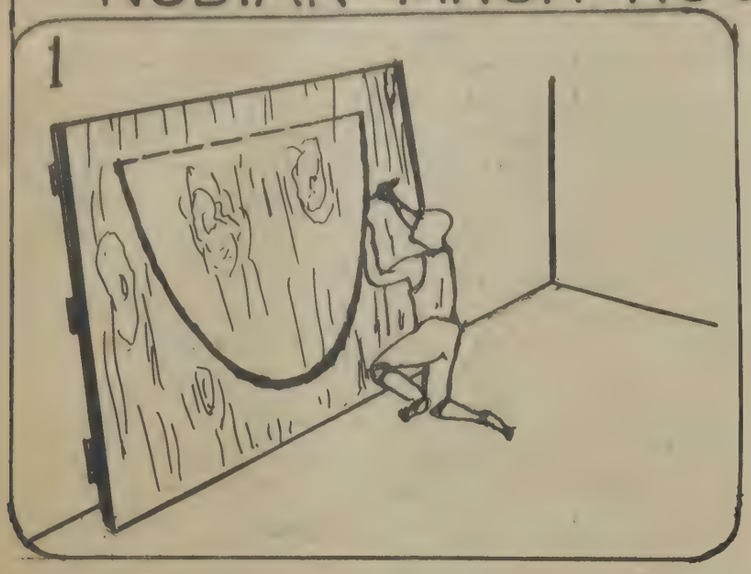
Out of the 50 housewives, half of the respondents belonged to joint families. A majority of the nuclear families belonged to large families. The average farm size of these families was 2 to 3 acres. A majority of the respondents belonged to low socio-economic status, and none was in high socio-economic group. All were illiterate.

Average Time Spent on Household Chores-The information with this regard is presented in the Table.

Average time spent by rural women on household and agricultural activities etc.

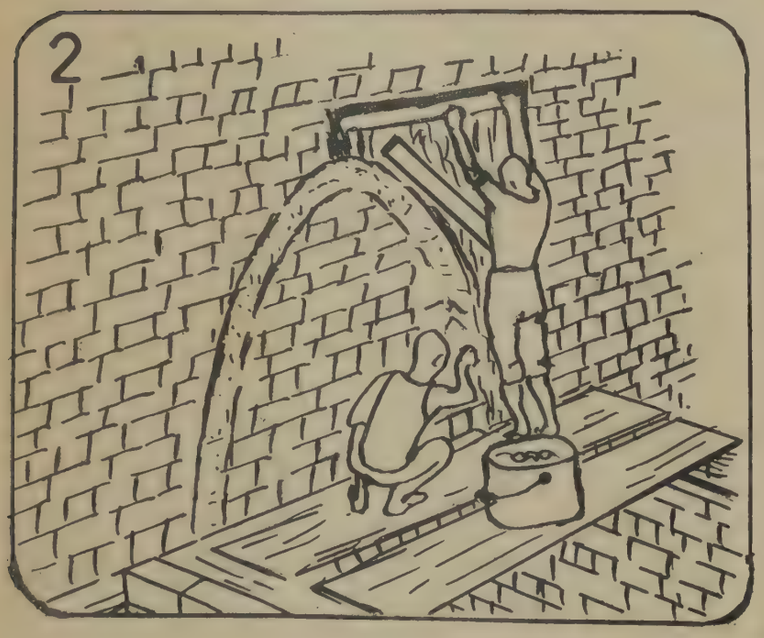
Perusal of the table reveals that on an average 9 hours were

NUBIAN ARCH ROOF : Construction Procedure - I



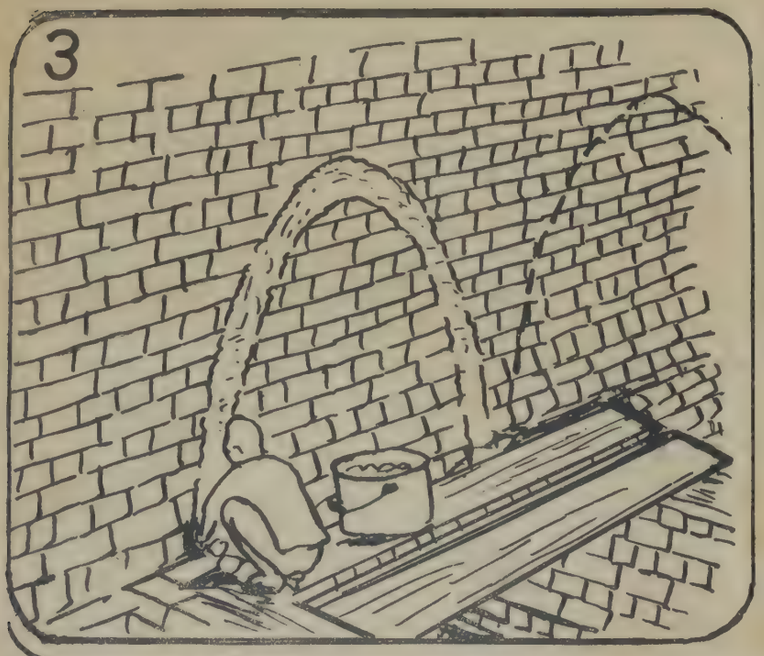
As per as statics are concerned not a circular but a more hyperbolic form is the best shape for making an adobe vault. This form is made by hancing a chain on the two nails A and B. This distance CD is 1.4 times longer than the distance AC. The maximum span AB is 3.5 to 4.0 m.

A wooden template is made according to this shape.



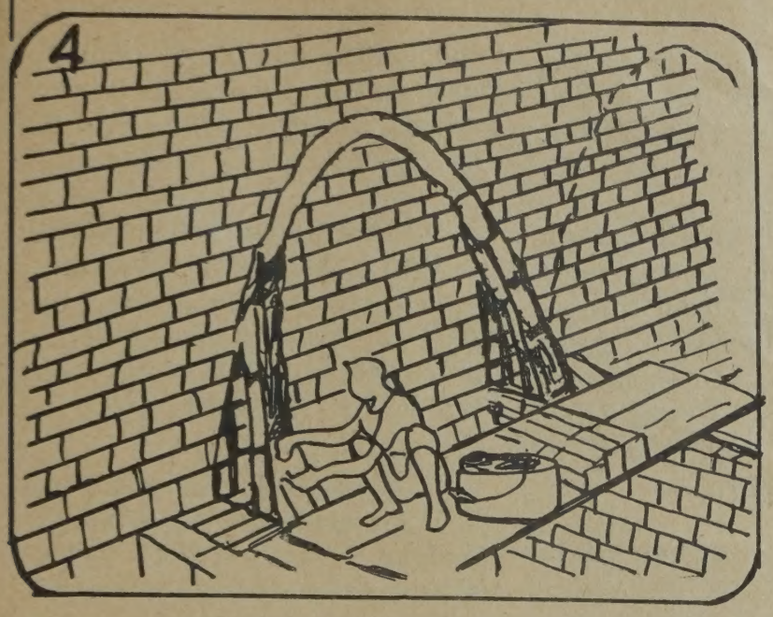
Brick laying work starts at the end walls which must be given sufficient time for drying to reach its maximum stabitity.

The shape of the vault is drafted by means of the template on to the end wall, which is masoned first to lean the vault to it. Mud mortar is applied to it by a trowel or by hand.

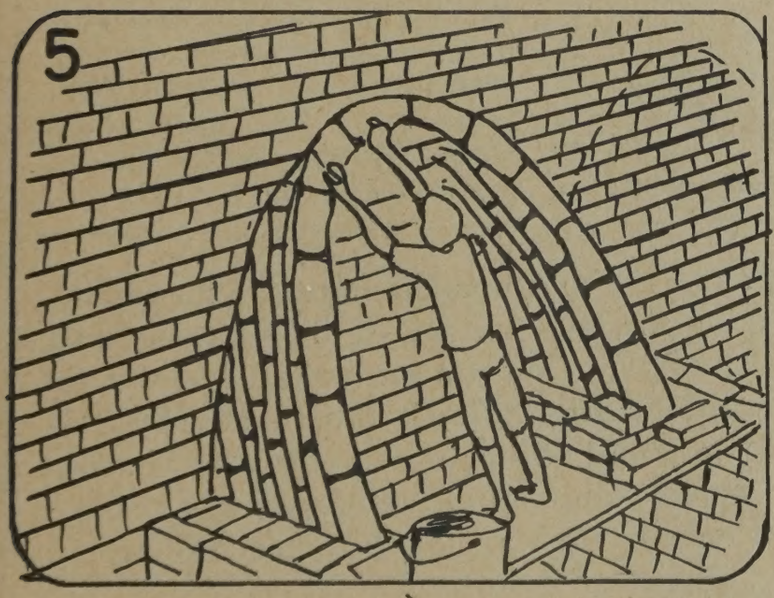


The mason places the first brick which is very important as it sets the cant of the subsequent courses. The slope is about 1:10 to words the end wall. The bricks are held in place by mud mortar and friction developed by small grooves on the face of the bricks.

NUBIAN ARCH ROOF: Construction Procedure-II

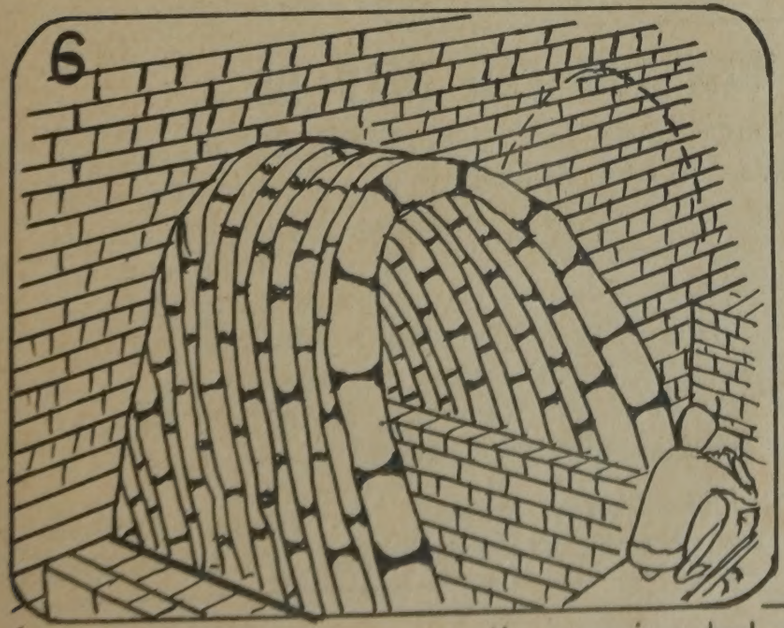


Since the mason uses a whole brick on the first course. The uses half a brick to start the second course in order to stagger the joints between the brick courses. Before masoning the next course mud morter is applied.

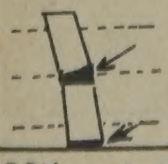


Each course is masoned in parallel, starting from the base point (A and B) so that the last brick at the top (D) of the bow completes the vault.

A shown in 6. The courses have a saw-tooth-shaped surface, this is an advantage for the later application of the plaster.



Because the bricks are rectangular in shape and are being placed to form a course with inner edges touching the outer edge are separated by a wedge-shaped gap. Mud mortar must be used to fill this gap and a small stone - part of a broken brick - is tapped into place at the outer edge to distribute the downward dead load equally between both edges This method was revived by Dr. Hassan Fathy.



(The Nubian Arch was recently experimented at CSV and discovered Very Successful.)

BOOKS RECEIVED

'Basic Technics in Ecological Farming And The Maintenance of Soil Fertility'; edited by Stuart Hill and Pierre Ott. 1982, P. 365.

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'Directory of Resource Institutions Engaged in Rural Development'; edited by I. R. Kumar. Published by National Research Development Corporation of India, New Delhi. 1982, P. 323.

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Apology: We beg our readers' apology for the inordinate delay in the publication of the October and November issues of SFV. We are sorry that we have yet not got over our difficulties. Kindly note that the December issue is being jointly brought out with the January issue and will be reaching you in the last week of December. This next issue is a special for the Science Congress. Seeking your indulgence - Editor

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Please write to : **The Editor, Science for Villages, Magan Sangrahalaya, Wardha, 442001. (M. S.) INDIA.**

POINTS TO PONDER

Global Oil Consumption Decrease

In coal, natural gas, nuclear and water power continue to take a larger share of the world energy market in place of oil. In 1981 consumption of these four 'alternatives' to oil increased by 1·2 per cent worldwide compared with 1980. Oil consumption on the other hand, according to the latest BP Statistical Review of World Energy fall in oil consumption in Western Europe was of 7·4 per cent in Japan of 5·6 percent, in Sweden 12·6 per cent, and in France 9·6 per cent. However, in the Middle East the demand rose by 3·3 per cent and in Africa by 5·4 per cent. India, too, has not decreased its oil consumption. (Asia Pacific Technology Digest).

Save Our Soil

How critical is the situation ? Recent statistics put the country's land area at 305 milion hectares. Of these 18 million hectares are under urban and other non-agricultural uses; and 24 million hectares are classified as barren and uncultivable. Of the 266 million hectares that remain : 83 million are classified as forests and permanent pastures. Presumably, therefore, 183 million hectares could be farmed But 17 million hectares are classified as cultivable wastes and as many as 23 million hectares as fallow leaving only 143 million hectares to be called agricultural lands. Much worse, only about 35 million hectares, out of 83 million said to be under forests and pastures are actually covered with trees or grass.

About 3 million hectares suffer by shifting cultivation a traditional way of farming on hill slopes by the slash and burn method of clearing land which is prevalent in North-Eastern India and to some extent in Andhra Pradesh and Orissa.

According to a report by the National Commission on Agriculture about 175 million hectares i e. 53 per cent of the total geographical area of the country suffers from soil erosion and land degradation.

Of these 175 million hectares declared problem areas 24·37 million hectares have been covered by the scheme for soil and water conservation Another 4·06 million hectares have been treated under programmes for desert and drought-prone areas conservation of Himalayan ecology and social forestry. Thus a total of 28·53 million hectares were treated by 1980–81 at a cost of about Rs. 732 crores. (Ranu Bhatnagar in Nagpur Times of 26 Oct.)

Man Equipped To Destroy

The cost of one destroyer – Rs. 90 crores – is sufficient to provide electricity to 13 cities and 19 rural zones The cost of one jet fighter – Rs. 18 crores – can provide medical facilities to 40,000 villages, while that of one "Hawk" ground attack aircraft is what is needed to bring water to 1·5 million people. The amount spent on military forces and aims in the world in just two weeks could look after the food, home, health and educational requirements of all the people in the world. The world was spending nearly 600 billion dollars on arms, which works out to more than one million dollars per minute. Nearly 83 per cent is spent by the nuclear powers and the industrialised nations The West Asian countries spend 8·3 per cent, the "high economic growth" for east countries spend 3·8 per cent and the remaining 4·9 per cent is spent by 90 developing nations of the world Out of about 130 instances of international violence since World War II, over 120 took place in the developing world and in two-thirds of them the super-powers were involved directly or indirectly. Ninety three per cent of the World's arms trade originates from the industrialised nations and 99 per cent of the world military research and development expenditure is also incurred by them. (Facts brought out at the exhibition on "Disarmament and Development" held at India International Centre, New Delhi on October 12 to 14).

Modern Houses Are Pollution Prone

The inside environment of houses of modern design have been found more pollution prone than ancient one. According to the study published in the journal bio-science, The study conducted at the National Research Council, USA has also included indoor pollution in environmental pollution as people spent as much as eighty to ninety per cent of their days indoors. The report drew the attention of the researcher to the causes of pollution among which micro-organism and allergens, temperature and humidity, indoor combustion, tobacco smoke and some radio-active substances are of great concern. Extremes of temperature although no pollutant by itself can also affect the human system considerably.

Bullock Power

In India there is 4,000 crore acres of pliable land area. We need more than 4 crore ploughs to till this soil, which means we required –

8·00 crore bullocks as draught-power.
+ 1·70 crore bullocks to pull our vehicles.
+ 2·80 crore bullocks to run village industries etc.

Thus, 12·50 crore bullocks is our minimum requirement.

As against this, our total bullock population today is only 7·33 crores This gap between necessity and availability is sharply increased every year with mounting slaughters.

(VIGIL – Sept. 3, 1982).